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Article

Plea for a Processual Perspectivism: Toward a Philosophy of Enactive Inference

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Abstract

This paper undertakes an ontological remapping of the philosophy of mind in light of the theory of enactive inference. We argue that David Chalmers' famous "Hard Problem" of consciousness is not an isolated puzzle awaiting resolution, but rather the symptom of a deeper, flawed premise: the stubborn persistence of a substance ontology and classical binary logic in our thinking. By drawing on the historical "Jacobi Dilemma," we demonstrate that any attempt to grasp consciousness as an isolated property inevitably leads into logical dead-ends. As an alternative, we develop a "Processual Perspectivism" (Leidig, 2025). By integrating current neurobiological findings on criticality (Tucker et al., 2025) and the thermodynamics of living systems (Non-Equilibrium Steady States, NESS), we demonstrate that consciousness is not an additional ingredient but must be understood as the intrinsic, affectively regulated control structure of autopoietic processes. It is not the puzzle, but the very solution to the problem of life itself.

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Public Significance Statement

This study challenges the long-standing view that consciousness is a mysterious "ghost in the machine" separate from our physical bodies. Instead, it proposes that our subjective experience—our feelings, sense of self, and search for meaning—is the necessary internal perspective of a living system struggling to maintain itself in a chaotic world. By combining modern brain science with philosophical logic, we show that feelings are not just "add-ons" but essential tools for survival. This shift in perspective suggests that even our highest values and spiritual quests are deeply rooted in the biological processes that keep us alive, offering a new way to understand human nature beyond the divide of mind and matter. This has profound implications for how we view artificial intelligence, suggesting that true understanding requires biological vulnerability, not just data processing.

Introduction: The Shadow of Cartesianism and the Persistent Dilemma

Contemporary philosophy of mind labors under a wound far older than modern debates about qualia or neural correlates. Despite the enormous, almost breathtaking empirical progress of cognitive science, the theoretical field remains shot through with a deep ontological rift. On one side stands the reductionist attempt to break down our rich subjective experience into physical mechanisms; on the other, the stubborn insistence on the irreducibility of the phenomenal. This tension found its perhaps most striking modern articulation in David Chalmers' formulation of the "Hard Problem of Consciousness" (Chalmers, 1996).

Chalmers' diagnosis possesses a penetrating sharpness: functional explanations—the so-called "Easy Problems" of information processing—leave open the decisive question of why this processing should be accompanied by experience at all. Why does all this not occur in the dark? His solution,

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however—a naturalistic dualism that posits consciousness as a fundamental property alongside physical matter—tragically remains trapped within those very categories that constitute the problem in the first place. By treating consciousness as a fundamental "ingredient" tacked onto physical processes, he perpetuates, albeit in modern guise, a static substance ontology (Leidig, 2025). He enshrines the puzzle as a law of nature rather than dissolving it.

This contribution pursues a different, more radical strategy. Rather than solving the "Hard Problem" within the dualist framework, it aims to deconstruct the framework itself. We argue that the aporias of modern philosophy of mind—from the zombie argument to the explanatory gap—are structural repetitions of a historical problem: the "Jacobi Dilemma." Friedrich Heinrich Jacobi demonstrated already in the 18th century that one cannot retroactively close a gulf that one has first created through absolute concepts with bridges.

The thesis of this essay is as follows: Only a radical shift from a substance to a process ontology, grounded in the theory of enactive inference and the thermodynamics of open systems, can resolve this dilemma. We propose a "Processual Perspectivism" that understands consciousness not as a property, but as the necessary intrinsic perspective of a self-regulating, criticality-based system (Leidig, 2025). In so doing, we rely on the groundbreaking work of Tucker, Luu, and Friston (2025) on affective criticality to show that the phenomenal dimension is not a metaphysical add-on, but the operative control parameter of living self-organization—the indispensable feeling of being alive in order to remain alive.

The Jacobi Dilemma: The Primal Wound of Representationalism

To understand the structural weakness of contemporary dualist and representationalist approaches, a genealogical retrospective is necessary. The modern problem of mediation between inside and outside, between mind and world, finds its precise logical formulation in Friedrich Heinrich Jacobi's critique of Immanuel Kant.

The Impossibility of Mediation

In his penetrating engagement with transcendental idealism, Friedrich Heinrich Jacobi laid bare the deep wound in Kantian architecture and uncovered a fatal, system-immanent contradiction. The problem ignites at the genesis of empirical knowledge: In order to explain how sensibility itself is activated—how, that is, the material of sensation (the "manifold") enters the cognitive system—Kant finds himself compelled to posit an external, subject-independent reality. This "Ding an sich" (thing-in-itself) must act upon human sensibility (affection) in order to set the process of knowledge in motion at all. Without this impetus, the knowing subject would remain trapped in an empty, solipsistic circle.

Yet it is precisely here that the logical trap, which Jacobi analyzed with precision, snaps shut. To preserve the purity and consistency of his Critique of Pure Reason, Kant had strictly limited the validity of the categories—and especially causality—to the domain of possible experience, that is, the world of appearances (phenomena). For Kant, causality is not a property of the world in itself, but rather a synthetic achievement of the understanding that links events in time. Yet when Kant assumes that the thing-in-itself is the cause of our sensations, he illegitimately applies the category of causality to the relationship between the noumenal (the unconditioned) and the phenomenal. He uses a category to ground the domain within which that category first acquires validity.

Jacobi exposes this procedure as a performative contradiction that destabilizes the entire system. He captured this incoherence in the famous, almost tragic dictum: "Without that presupposition [of the thing-in-itself], I could not enter into the system, and with that presupposition, I could not remain in it" (Jacobi, 1787/2021, p. 223). Thus the dilemma is marked not merely as a logical error, but identified as an ontological dead-end: The attempt to connect two substantially separated domains—the absolute outside of reality and the absolute inside of representation—through a static bridge must fail. The "Ding an sich" becomes a "logisches Monstrum" (logical monster): It is necessary for the beginning, but impossible for the continuation of the theory. So long as one remains within an

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ontology that fragments reality into isolated substances (here world, there subject), the interface—affection—remains an unexplainable miracle or a logical rupture.

This is not a mere historical footnote. The Jacobi Dilemma describes the logical impossibility of building a bridge between two ontologically separated domains (subject/object, inside/outside, phenomenal/physical) when one has previously posited this separation as absolute.

The Reification of the Dilemma in Modern Cognitive Science

In contemporary debate, the Jacobi Dilemma no longer manifests as a problem of metaphysical causality, but rather as a structural paradox of cognitive science. Wherever the brain is understood as an "inference machine" that operates in isolation within the dark skull and attempts to reconstruct from sparse sensory data an internal model of an unreachable external world (Hohwy, 2013), the problem returns in new form. This representationalist reading of predictive processing reproduces Kant's separation at the neurobiological level: We have access to our models (the neural representations), but access to the world itself (the external causes) remains a logical inference, an inference whose validity we can never directly verify, since we can never "step outside our heads" to compare model and world. Cognitive science here becomes heir to the Kantian aporia, trapped in a skepticism that results from the ontological separation of inside and outside.

David Chalmers' property dualism (naturalistic dualism) is perhaps the most sophisticated, but also the most fatal, metaphysicization of this dilemma. Although Chalmers explicitly rejects classical substance dualism and replaces it with the assumption that consciousness is a fundamental, irreducible property of the universe—analogous to physical constants such as mass or charge (Chalmers, 1996)—this strategy does not solve the interaction problem; it merely enshrines it as a "psychophysical law." By treating the phenomenal as a fundamental "ingredient" added to physical structure, he remains in the shadow of Cartesianism.

Even without a metaphysics of the soul-substance, Chalmers continues to operate with the logic of substance ontology. This is nowhere clearer than in his famous zombie argument. The assumption that it is logically possible (conceivable) that a system be physically and functionally identical to us but possess no experience whatsoever implicitly presupposes that the physical structure of the world is ontologically self-sufficient and closed. Consciousness thus becomes an extrinsic attribute that can be thought away without the physical reality collapsing.

In a radical process ontology, as enactive inference suggests, this premise of isolation is the actual error. Structure is here nothing other than frozen process. A "philosophical zombie"—a complex, autopoietic system (NESS) that survives in a volatile environment but lacks an affective inner perspective—is not merely empirically nonexistent but thermodynamically impossible. Without the affective prioritization (care) that holds the system in criticality, functional organization would collapse (Leidig, 2025). Chalmers' approach thus fails not for want of data but from a categorical error: He separates what is ontologically interlaced in the performance of life.

Against this "Mythos des Gegebenen" (myth of the given) (Sellars, 1956/1997)—which criticizes the notion that knowledge rests on unmediated, raw data (whether sense-data or qualia)—and which permeates both empiricism and dualism, we set a radically different perspective. We draw on the biologically grounded insight of autopoiesis (Maturana & Varela, 1980) and the theory of enactive inference. Here cognition is understood not as the mirroring or representation of a pre-given external world, but as the enaction—the bringing forth—of a lifeworld by an organism. This organism is not isolated but constitutively interwoven with its environment; it exists only in and through this exchange (Varela et al., 1991). The Jacobi Dilemma is not solved here by building a bridge between two separate shores, but by unmasking the separation itself as an artifact of a false observer perspective. Inside and outside are not ontological absolute opposites but dialectical moments of a single, continuous process of life. The shore on the far side and the shore on this side reveal themselves as parts of the same continuous terrain, connected through the dynamic activity of life itself.

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The Philosophy of Enactive Inference: From Image to Resonance

The debate surrounding the Free Energy Principle (FEP) marks a turning point in our understanding of the living world, yet behind the mathematical elegance of the formulas lies a profound ontological bifurcation: Does the FEP serve as ultimate proof of an isolated mind that merely mirrors the external world, or does it lay the foundation for a radically embodied mind that resonates with it? At the center of this confrontation stands the Markov blanket—a mathematical boundary that in classical cognitivism is all too often misunderstood as an epistemological wall separating inside from outside. Yet when we link the biological principles of autopoiesis with recent findings on neural criticality (Tucker et al., 2025), the picture transforms fundamentally: Active inference appears no longer as the cool attempt at correct representation, but as a thermodynamic imperative for the preservation of structural integrity (NESS). From this perspective, the brain reveals itself not as an archivist of truth (veridicality) but as an instrument of viability, whose primary task is not the representation of a pre-given world but the successful navigation through a reality that is brought forth in the very act of living.

The Free Energy Principle: Battleground of Ontologies

The Free Energy Principle (FEP), formulated by Karl Friston, has emerged as the dominant meta-theory of modern neuroscience, claiming nothing less than to deliver a unified physics of the living world. In its mathematical essence, it states that every self-organizing system, in order to resist its thermodynamic dissolution, must minimize an upper bound on surprise—formalized as Variational Free Energy (Friston, 2010). In a world that obeys the second law of thermodynamics and inexorably tends toward disorder, the survival of an organism is a statistically improbable event. To persist as an ordered structure—to avoid diffusing into heat death—a system must avoid entering states that are "surprising" to its physiology (that is, lethal or unpredictable). Variational Free Energy serves as a computable proxy for this existential surprise: It is the discrepancy between what the system expects on the basis of its internal structure and what it actually registers sensorimotor.

Yet this mathematical elegance masks a profound philosophical struggle for interpretive authority, one that often rages unnoticed in the background of the equations. The mathematics itself is ontologically silent; it describes mechanisms of error reduction but not their metaphysical status. Is the FEP ultimate proof of an isolated mind that models the world, or the foundation for a radically embodied mind that brings the world forth? On one side, cognitivists read the FEP as confirmation of ultimate internalism: The brain becomes a perfect prediction machine that—isolated behind the veil of perception—attempts to guess the hidden causes of the world without ever directly touching them. On the other side, the same principle offers the cornerstone for radical enactivism: Here the system minimizes free energy not through passive representation but through active engagement, through the "enacting" of a world that matches its survival conditions. The answer to this question determines whether we continue to stand in the shadow of Cartesianism, trapped in an epistemology of distance, or whether we venture the step into a new, processual ontology—an ontology of resonance in which we as living agents are inseparably woven into the fabric of the world.

Neuro-Kantianism (Hohwy)

The classical reading, prominently represented by Jakob Hohwy (2013), interprets the FEP strictly within cognitivism. For Hohwy, the brain is an "inference machine" imprisoned within the dark skull. It has no direct access to the external causes of sensory data. To survive, it must construct a hierarchical, generative model of the external world in order to predict incoming signals ("Prediction Error Minimization"). The brain acts here like a scientist who formulates hypotheses about the world and tests them against data. Yet unlike the scientist, the brain can never "look outside" to directly verify its hypotheses. It remains dependent on the signals that reach it.

This position, often termed "Neuro-Kantianism" (Clark, 2013), reproduces exactly the aporias of the Jacobi Dilemma. It presupposes an ontological gulf between the model (inside) and the world (outside). The Markov blanket becomes here an impermeable epistemic wall, reified and hardened,

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behind which the system remains trapped in a skeptical circle: It can never test its models against reality itself, only against proxies of sensory excitation. The system optimizes its representation but remains ontologically isolated. The world becomes merely a source of disturbances to be explained away rather than understood as a living partner in dynamic exchange. This view leads to a solipsism in which the subject remains imprisoned in its own virtual reality, unable to truly touch the world.

The neuro-Kantian perspective, as represented by Hohwy, can be understood as a modern, neurally disguised form of skepticism. It posits that the brain, due to its neuroanatomical isolation—imprisoned within the dark skull with no direct access to the world—is forced to infer the world indirectly. This isolation produces an epistemic rupture: We do not experience the world itself, but only our model of it. Our perception thus becomes a controlled hallucination, merely corrected by sensory data. The consequence is a radical separation of mind and world that casts the subject in a spectator role. It does not view the world directly but through the filter of its neural machinery.

This separation carries far-reaching implications for our self-understanding. If we experience the world only as a model, how can we then be certain that our models adequately represent reality? How can we distinguish between hallucination and perception if both rest on the same neural mechanisms? Hohwy attempts to solve this problem through the principle of error minimization: Models that better predict sensory data are "truer." Yet this merely shifts the problem. For "truth" is here reduced to "predictive success." A model can, however, successfully predict without correctly representing the structure of the world (as the Ptolemaic worldview, which could predict planetary motions without being heliocentric). Neuro-Kantianism thus remains trapped in a circle: We test our models against data that our models themselves predict. An escape from this circle is impossible within this logic.

The Enactive Turn (Radical Predictive Processing)

Against this, stands the enactive interpretation, which we here advance following Varela, Thompson, and Rosch (1991), as well as more recent work by Ramstead et al. (2020) and Leidig (2025). It radically rejects the premise of isolation and accomplishes an ontological reversal. Here the brain is no longer seen as an isolated calculator or "brain in a vat" manipulating symbols in abstract emptiness, but as an integral, pulsing component of a biological organism deeply embedded in its environment. Cognition, in this sense, is not the sterile processing of information about a detached world, but the embodiment of a vital dynamic in the world. Mind is not a spectator but an agent whose very existence depends on successful metabolic and sensorimotor coupling with its surroundings.

In the enactive reading, the status of the generative model transforms fundamentally: It is not a map of the world—no representational image that would need to be tested for semantic correspondence with external reality—but rather a pragmatic specification of interaction with the world. It resembles more a manual for successful coupling or a navigation instrument than a static atlas. The organism minimizes free energy not primarily by passively adjusting its perception (perceptual inference) and thus correcting its worldview, as though it were a scientist falsifying a theory. Rather, it minimizes surprise by actively engaging the world, so as to change it such that it conforms to its deepest, life-sustaining expectations (active inference). When an organism, for instance, registers a drop in body temperature (a prediction error regarding its physiological priors), it does not alter its expectation ("I should be cold") but rather acts—it shivers, seeks the sun—in order to bring sensory data into alignment with its vital expectation ("I must be warm").

The system thus poses the question not as a disinterested theoretical inquiry—"What is the world like?"—but as an existential urgency: "How must I behave in order to maintain my structural integrity?" (Friston, 2013). This does not, however, entail a departure from reality in favor of arbitrary relativism. Truth is not abolished but rather shifted from the metaphor of mirroring to that of fit. The criterion of success is not accurate representation of an objective reality but structural compatibility with it. One might compare this to the relationship between key and lock: A key need not look like a lock—it is not an image of it—but it must fit precisely into its mechanical structure to function. If it

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does not fit, the lock offers resistance. In this sense, the world of enactivism is profoundly real: It is that which offers resistance to our actions. Viability means navigating this resistance through structural fit.

Perception and action, from this perspective, are not separate processes—sensory input here, motor output there—but two inseparable sides of the same coin. Perception is a form of action: We actively explore the world with our gaze, we move our heads to hear better; we probe the affordances of our environment. And action is a form of perception: We manipulate the world to generate new sensory feedback and test our hypotheses. The organism feels its way through the world, and in this active, sensorimotor exploration, there emerges what we experience as world—a world that does not await us as pre-given but that is brought forth in the very process of living (enacted).

The Markov Blanket as Ontological Hinge

In order to render enactive inference philosophically robust and not merely to circumvent the Jacobi Dilemma diagnosed in Chapter 2 but to heal it at its root, we must radically rethink the concept of the Markov blanket. Originally a statistical tool developed by Judea Pearl (1988) to define conditional independencies in Bayesian networks, it was extended by Karl Friston in a brilliant yet often misunderstood move to the definition of biological boundaries. This extension must, however, not be misunderstood as the erection of an impermeable wall isolating the interior from the exterior.

Critique of Reification: From Thing to Process

In classical substance ontology, which thinks in terms of things and properties, the Markov blanket is almost reflexively reified as a physical boundary. One imagines it as the skin that envelops the body or the skull that shields the brain from the universe—as a barrier separating the "I" from the "not-I." This is the fundamental error of internalism, which regards the system as a container in which the mental is safely stored. Yet as Leidig (2025) shows, drawing on Bruno Latour's network ontology and process philosophy, the Markov blanket is not a static wall, not a thing one could touch. It is, precisely formulated, a statistical boundary that supervenes on the process of differentiation.

Imagine a whirlpool in a river. Where is its boundary? It is not made of concrete. It consists of water—just like the whirlpool and the river itself. The boundary is the dynamic process that maintains the form of the whirlpool while matter continuously flows through it. Precisely so with the Markov blanket. It is not a thing but an event. Formally, a Markov blanket consists of two sets of states: the sensory states (through which the world acts upon the system without the system directly controlling this) and the active states (through which the system acts upon the world without the world directly controlling this). These states separate internal and external states statistically—that is, if you know the blanket, you learn nothing new about the interior by observing the exterior (and vice versa). But—and this is the crucial dialectical point—they operationally couple them. It is real as the boundary of resistance where the entropy stream is broken, yet it is "empty" of independent substance, since it exists only through the process itself. It is like a semipermeable membrane, selectively permeable and regulating exchange rather than blocking it. It is the place where inside and outside touch, where they enter into an intimate, life-sustaining dialogue.

Autonomy Through Structured Dependency: The End of Isolation

Here lies the decisive ontological shift that grounds Processual Perspectivism and revolutionizes our classical understanding of individuality: The Markov blanket does not isolate the system into solipsistic solitude; rather, it constitutes it as an active node in a causal flow. In substance ontology, autonomy is often conflated with autarky or detachment—as though a system were all the more autonomous the less it needs from the world. Yet the opposite is the case. A system does not "have" a Markov blanket as a static property among others; rather, it is the activity of maintaining this boundary against the entropy stream (Kirchhoff et al., 2018).

True autonomy in this context means not independence from the world but the capacity to regulate one's own dependencies, to structure and channel them. Autonomy is the competence to

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open and close oneself deliberately, to modulate the flow of energy and information rather than be overwhelmed by it. A stone is isolated but not autonomous; it is eroded by the environment. A cell is radically dependent on nutrients and heat, but it is autonomous because it actively manages these dependencies, selectively importing and exporting. Its boundary is not there to shut the world out but to organize exchange with it. The Markov blanket is thus the organ of connection, not separation; it is the condition of possibility for a relationship to the world.

In this perspective, the Kantian "Ding an sich" (thing-in-itself) vanishes as an unreachable, mystical beyond that lurks beyond our epistemic reach. There is no thing beyond interaction, no hidden substrate we could never reach, because reality for an organism is always constituted relationally. The "outside" is operationally defined solely and exclusively as that with which the "inside" interacts via the Markov blanket. What does not interact, what makes no difference to the Markov blanket, effectively does not exist for the system—it is irrelevant noise. For a bacterium, the "world" exists as chemical gradients and temperature differences; for a human, it exists as affordances, social signals, and cultural meanings. There is no absolute "outside" that exists independent of the system's specific organization; there is only the environment (in the sense of Jakob von Uexküll) that is cut out as relevant by the specific structure of the Markov blanket.

There is consequently no "outside" without an "inside" that constitutes it as such. Inside and outside stand in a relation of co-emergence: They arise together, in the same moment, through the same act of boundary-drawing. The inside is the fold in the outside; the outside is the horizon of the inside. They are dialectically interlaced like the two sides of a coin or like valley and mountain—one cannot think one without the other. The boundary does not separate them but brings them forth as distinguishable yet inseparable poles of a single process.

Thus the Jacobi Dilemma resolves itself elegantly. The dilemma rested on the assumption of a gulf that must be bridged—a gulf between inner representation and outer reality. Yet if the organism's reality consists in the interaction itself, there is no gulf. We need not desperately attempt to forge a bridge "outward" to the world to test the validity of our models. The metaphor of the bridge is misleading because it presupposes two shores originally separate. We need not break out of our heads to see whether our thoughts touch reality. Why? Because through the Markov blanket we are always already constitutively, causally, and dynamically interwoven with the world (Leidig, 2025a).

The validation of our models occurs not through comparison with an unreachable "truth" but through the success or failure of our actions, through viability and the system's survival. We are always already "outside" because our "inside" exists only through continuous friction, exchange, and resonance with the "outside." Our mind is not trapped in a tank, isolated from reality; it is woven into the world like a pattern in a tapestry, inseparable from the threads that compose it. The question is no longer epistemologically desperate—"How do I reach the world?"—but existentially and pragmatically urgent: "How do I shape my inescapable connection to the world so that it fosters my being?" The ontology of isolation gives way to an ontology of participation.

From Representation to Resonance: The Role of Criticality

If the brain is not a passive mirror of nature, attempting to generate a static image of the external world, what is it then? It is an organ of resonance and dynamic regulation. Its primary task is not correct representation in the sense of semantic truth (veridicality), but successful navigation in the sense of pragmatic viability. It is not about producing a perfect, academically correct image of the world, but about keeping the dance with the world in motion and maintaining the vital coupling. The brain is less like a camera taking snapshots and more like a tuning fork or musical instrument, bringing itself into resonance with the vibrations of its environment.

Thermodynamics of the Living (NESS): Order as Flow

To understand this reorientation, we must turn to the physical foundations of life. Biological systems are not static crystals, but non-equilibrium steady states (NESS). According to the second law of thermodynamics, every closed system moves inexorably toward thermodynamic

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equilibrium—a state of maximum entropy, which for an organism means death. "Equilibrium" is not rest for life but the final dissolution of all structure. To maintain their order, form, and functionality, living systems must actively resist this decay. They do so by channeling a continuous flow of energy (Schrödinger, 1944; Ramstead et al., 2019): drawing order (in the form of food and information) from the environment and releasing disorder (heat, waste) back.

Minimizing free energy is, in this context, nothing other than the operative side of this survival strategy. It means constraining the production of entropy to a level that upholds the physiological boundaries of the organism. The so-called "Dark Room Problem" makes this plain: If the only goal of the brain were to minimize sensory surprise, the best strategy would be to lie in a dark, silent room and die—for there are no surprises there. But living systems do not do this—because they contain a model of themselves that says, "I am an agent who seeks food, moves, and generates heat." A state of absolute silence would be deeply surprising (and fatal) for this model. Thus, minimizing free energy always implies minimizing the divergence between the current state and the expected, life-sustaining attractor states of the organism.

From this, it follows that every perception and action is fundamentally normative. It is never value-neutral; it follows the unconditional imperative of self-preservation. A "false" inference is not just a logical error or miscalculation, but an existential danger, a threat to autopoiesis. If a fish "concludes" it can breathe on land, this is not a theoretical mistake but a fatal one. Normativity—the "ought"—is not a metaphysical layer added onto biological being, but is deeply anchored in the thermodynamics of NESS (Jonas, 1966; Leidig, 2025). Values are not abstract ideas but biological necessities, encoded in the organism's survival parameters: "Good" is whatever maintains thermodynamic disequilibrium; "bad" is whatever accelerates decay.

Affective Criticality as Control Parameter: The Feeling Helmsman

How then does the system regulate this vital, highly dynamic interaction in a world more complex and unpredictable than any model? Here we integrate groundbreaking insights from Tucker, Luu, and Friston (2025) regarding neural criticality. The brain does not operate in a rigid regime of order (where everything would be predictable but inflexible), nor in pure chaos (where everything would be flexible but uncoordinated). It operates optimally at the margin between both---in a state of criticality, a phase transition.

In statistical physics, this state is characterized by properties such as scale-freeness and avalanche-like propagation of activity. Why is this existentially vital for an organism? Because in this poised, critical state, the system is maximally sensitive to relevant signals (it can distinguish the subtlest nuances that spell life or death), while also maximally flexible in adaptation (able to switch quickly between global states without becoming trapped in an attractor). It is like a tennis player not standing rigidly but bouncing lightly on their feet, ready to spring in any direction. Criticality is the neural state of maximal information processing and adaptability.

But this critical state is precarious and fragile; it does not establish itself automatically, but must be actively regulated and fine-tuned. Tucker et al. (2025) demonstrate that this balance between excitation and inhibition---the E-I balance---is not regulated mechanically, but affectively. Here we see a radical reinterpretation of emotion. Affect and emotion are not---as often assumed in cognitive tradition---the passive, downstream result of cognitive evaluation ("I see the bear, the cortex analyzes danger, so my limbic system generates fear"). Affect is much more fundamental: it is the control parameter itself, the "master prior" that sets and modulates the global dynamics of the system.

Affect regulates the precision (precision weighting) of prediction errors. It determines how much weight the brain assigns to sensory error signals (the "new") compared to internal predictions (the "expected"), tuning the "gain" of neural circuits. Anxiety, for example, is not an irrational disturbance but a functional shift of the E-I balance toward excitation. It massively increases sensory precision: The system becomes hyper-vigilant. Every rustle in the bushes, every tiny prediction error becomes dominant and triggers immediate reactions to avoid missing potential dangers. The price is a high rate of "false alarms," but the payoff is survival.

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Depression, by contrast, can be understood as a state in which the system becomes trapped in rigid order/inhibition. The internal, negative priors ("I am helpless," "everything is meaningless") are so heavily weighted (high precision on the priors, extremely low on the sensory input) that no new, positive experience can break through. The system becomes deaf to the world, imprisoned in its own dark model.

Feelings are thus the internal language in which the system communicates with itself about its own state (interoception) and its relationship to the environment (exteroception). They are the signals indicating how urgently action is needed (viability) and how reliable the current information is (precision). The Markov blanket is not a rigid boundary but a feeling, permeable membrane whose permeability and sensitivity are affectively modulated.

Consciousness---understood as phenomenal, affective experience---is thus the intrinsic perspective on this criticality-dependent regulation. The system "feels" its own approach to dangerous states (high entropy/surprise/decay) immediately as displeasure, anxiety, or pain. And it feels the successful minimization of uncertainty, the regained coherence after "surfing" the wave of reality, the restoration of harmony, as pleasure, flow, or joy (Leidig, 2025b). Consciousness is not the cool observer of life, but the immediate, affective experience of the living process itself---the felt vitality of the precarious yet creative struggle with the world.

Interim Conclusion: Farewell to Representationalism

The philosophy of enactive inference, as unfolded in this chapter, is more than merely an alternative theory of mind; it is a radical break with the foundational intellectual tradition of modernity. By liberating ourselves from the chains of cognitivism and its hidden Cartesian premises, we open an ontologically parsimonious and yet empirically robust alternative to dualism—one that re-anchors mind firmly in nature without reducing it to mere matter. This departure from representationalism unfolds in three decisive steps:

No Representation: The brain does not construct images of the world; it constructs tools for engaging with the world. It is not a passive observer watching an internal cinema, but an active agent that creates meaning through its very actions. The generative model is not a map to be compared with territory, but a navigation instrument that helps us find the way. Truth is not correspondence; it is successful coupling.

No Isolation: The Markov blanket, long misunderstood as a wall, reveals itself as a dynamic coupling mechanism. We are not imprisoned in the skull, isolated from the "real" world. We are constitutively connected to the world through the Markov blanket. Inside and outside are not separate realms but dialectical poles of a single process of self-differentiation. Autonomy does not mean independence; it means the capacity for structured interaction.

No Neutrality: Cognition is never value-free. It is deeply motivated by the thermodynamic imperative of self-preservation (NESS). Thinking is always also feeling and willing, saturated by care for one's own continuance. Affect is not noise in the system; it is the signal showing us how we stand toward the world. Consciousness is the immediate felt sense of this existential concernedness.

By ceasing to misunderstand the brain as a biological computer that processes symbols, and instead grasping it as the regulatory center of an autopoietic process, the need to construct a mysterious and ultimately impossible bridge between mind and matter dissolves. There are not two substances that must somehow interact. There is only one process of self-organization, which appears to us—depending on perspective—as neural dynamics (third-person) or as affective experience (first-person). This insight leads us in the next chapter to the full articulation of Processual Perspectivism, which integrates these insights into a comprehensive new ontology.

Processual Perspectivism: A Logic for the Living

Introduction: The Limits of Classical Logic in the Face of Life

With the establishment of enactive inference in Chapter 3, we have abandoned the ground of classical representationalism. We have understood the brain not as a mirror but as an organ of

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resonance, and we have defined the Markov blanket not as a dividing wall but as a coupling mechanism. Yet precisely at this point we encounter an obstacle that runs deeper than any empirical question: a logical one.

How can a system—as we have described it—be simultaneously autonomous (bounded through its operative closure) and dependent (constituted through its thermodynamic openness)? How can the Markov blanket be a real causal boundary and yet also a perspectival positing of the observer? In classical, Aristotelian logic, which rests on the Law of Excluded Middle (tertium non datur), these are contradictions. A thing is either A or not-A. It is either real or constructed. It is either inside or outside.

This binary corset, such is our thesis, is the actual reason why the philosophy of mind fails at the "Hard Problem." Life itself does not observe binary logic. It operates in a zone of ambiguity, of simultaneity of opposites. To understand mind, therefore, we must not only update our neurobiology but radically revise our logical operating system itself (Leidig, 2025). We require a logic capable of formalizing processuality and mutual interpenetration without collapsing into incoherence. We call this approach "Processual Perspectivism."

The Antinomy of the Boundary: Realism versus Instrumentalism

The problem becomes acute at the ontological status question of the Markov blanket, a question that extends far beyond a technical debate and touches the core of our conception of reality. In current discussions about the Free Energy Principle, two camps stand seemingly irreconcilable, marking what has been called the "reification problem" (Pearl, 1988; Kirchhoff et al., 2018):

Realism: This position claims that Markov blankets are objective, mind-independent structures in the world, comparable to cell membranes, skull bones, or planetary atmospheres. For the realist, the boundary is something one can "find," like a stone in the forest. It exists in itself (per se), independently of whether anyone describes it. The advantage of this view is its intuitive plausibility: when I cut myself, I bleed at a physically real boundary. The disadvantage is its rigidity: it struggles to explain how boundaries shift (for example, when a tool becomes part of the body schema) or why social systems have boundaries that are not physically tangible.

Instrumentalism: This position counters that Markov blankets are statistical tools, heuristic fictions that we as observers lay over the world to render its complex causality manageable. For the instrumentalist, "there are" no boundaries in nature; nature is a continuous flow. Boundaries arise only through the act of description, through the statistical model we apply. The advantage of this view is its flexibility: it allows us to redraw boundaries according to our question. The disadvantage is that it misses the ontological force of life. If the boundary is merely a statistical artifact, why then does the organism truly die when its physical integrity is violated? Why does death possess such brutal finality if boundaries are merely conventions?

Classical logic forces us to make a fatal choice: either the boundary is real, or it is constructed. Yet both options, upon closer inspection, lead to theoretical dead-ends. Naive realism fails at the fluidity and context-dependency of biological and cognitive boundaries (is the blind person's cane part of the seeing or part of the world?). Pure instrumentalism fails at the causal force of biological autonomy (an organism is not mere attribution; it offers resistance).

The solution does not lie in deciding for one side or the other, but in recognizing that the very framing of the question rests on a false premise: the separation of seer and seen, of deed and fact. Enactive inference teaches us that an autopoietic system is the activity of its own boundary-drawing (Varela, 1979). The boundary is not a thing that the system has but what the system does. It is simultaneously act (process of distinction) and fact (result of structuring). It is, as Leidig (2025) expounds drawing on the Two Truths doctrine, "conventionally real" (it is causally efficacious, one can strike against it) and simultaneously "ultimately empty" (it possesses no independent, unchanging substance; it exists only in relation to the process).

To think this simultaneity of reality and relationality, of structure and process, without contradiction, we must leave the prison of Aristotelian logic. We reach back to a logical tradition often

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overlooked in the West but precisely designed for such dialectical phenomena—and find in modern analytical philosophy an surprising ally.

Beyond Aristotle: Catuskoti and Paraconsistency

To not merely circumvent but logically to resolve the ontological dilemma between realism and instrumentalism, we must expand the binary operating system of Western metaphysics. Here a fascinating convergence presents itself between the Eastern logic of Nagarjuna (ca. 150–250 CE) and modern Western paraconsistency, especially the work of Graham Priest. Both traditions recognize that boundary phenomena require a logic that transcends the Law of Excluded Middle.

The Matrix of Possibilities

Nagarjuna developed with the Catuskoti (Sanskrit for "four corners" or tetralemma) a logical tool precisely tailored to relational phenomena (Nāgārjuna, 1995; Garfield, 1995). Where Aristotelian logic cleaves the world into "True" or "False," the Catuskoti offers a richer matrix:

- Affirmation (A is true): This corresponds to naive realism. The boundary is there, massive and objective.
- Negation (not-A is true): This corresponds to instrumentalism. The boundary does not exist in itself; it is an illusion.
- Both (both A and not-A are true): This is the position of interpenetration and dialectic.
- Neither (neither A nor not-A are true): This is the position of indeterminacy beyond linguistic categories.

For understanding the Markov blanket, the third position (both) is of decisive importance. In classical logic, the sentence "The boundary is real and not real" would be a fatal contradiction that explodes the system (*ex falso quodlibet*—from falsehood follows anything arbitrary). Yet what for Aristotle was an error in thought is for life a condition of existence.

Dialetheism: The Topology of the Boundary (Graham Priest)

To preserve this step against the accusation of mysticism, we turn to dialetheism, as formalized by the analytical philosopher Graham Priest. Priest (1987, 2002) argues compellingly that "true contradictions" (or dialetheias) are unavoidable at the boundaries of totalities.

Consider the Markov blanket topologically: It is the boundary that divides the system (A) from the environment (not-A). Yet to which does the boundary itself belong?

If it belongs to the interior, it is no longer the boundary but part of the content.

If it belongs to the exterior, the system is boundaryless and dissolves.

Priest shows that the boundary must ontologically belong to both realms to fulfill its function as interface. It is the place where inside and outside overlap. A Markov blanket is by definition a site of inconsistency in the classical sense: It is a zone of indistinction where the properties of the system and those of the environment converge (Priest, 2014).

When we apply this rigorous logic to our problem, the reification dilemma dissolves:

Is the Markov blanket real? Yes. It is conventionally real, for it exhibits causal resistance. When a virus breaches the membrane, the cell dies. The boundary marks the place where the entropy stream is physically broken.

Is the Markov blanket not real? Yes. It is ultimately empty of intrinsic nature. It is not a substance one could isolate like a brick. It exists only as relation. Remove the system or the environment, and the boundary too vanishes.

The Catuskoti and dialetheism allow us to describe this condition formally and correctly: The Markov blanket is a glut (a logical overflow), a place where opposing truth values converge. It is a performative reality, brought forth anew in each moment through the process of autopoiesis. It is as real as a whirlpool in a river—the whirlpool is a real structure with force and shape, but it consists of nothing other than the water that flows through it, and the next moment already leaves it behind.

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The Two Truths: Structure and Process

With the dialetheic logic now in hand, we can formulate with precision what we have intuited throughout: a doctrine of Two Truths, drawn from Buddhist philosophy but given new rigor through contemporary logic and thermodynamics.

In Madhyamaka Buddhism, particularly as developed by Nagarjuna and refined in later commentarial traditions, the doctrine of the Two Truths distinguishes between:

Conventional Truth (Samvrti-satya): The realm of manifest forms, of subjects and objects, of causality and time. This is the world as it appears within conventional frameworks. It is not "false," but it is relativistic, mind-dependent, and posited through perspective.

Ultimate Truth (Paramartha-satya): The nature of phenomena as empty of intrinsic, unchanging essence. It is not "truer" than conventional truth but reveals the condition of possibility that allows conventional truth to arise at all.

Critically, these two truths are not separate domains but two aspects of a single reality, viewed from different standpoints. A phenomenon is not "really" one or the other; it is both, simultaneously, from different perspectives (Garfield & Priest, 2003).

We propose to extend this doctrine to the nature of living systems and consciousness:

Conventional Truth (the perspective of the system): From the inside—from the autopoietic organism's own operative perspective—the boundary is absolutely real. There is a clear and rigid distinction between self and world. I feel the difference between my body and the environment when my hand plunges into ice water. My intentions are mine; the world's causality is external. The separation is phenomenologically undeniable. This is the realm of agency, meaning, and normativity. All values live here.

Ultimate Truth (the thermodynamic perspective): From the outside—from the viewpoint of thermodynamic and causal analysis—boundaries dissolve into processes. There is no self that exists independent of continuous exchange. There is no "internal" state that does not arise through external perturbation. There is no meaning that is not an emergent property of a far-from-equilibrium system. Matter flows, energy transforms, structure crystallizes and dissolves. From this view, the boundary is a fiction, albeit a functional one—a pattern, not a substance.

Crucially, neither perspective is "more true" than the other. Each is valid within its domain. The mistake of both naive realism and naive instrumentalism is to claim that one of these perspectives reveals the "true nature" of reality while the other is mere appearance or useful fiction.

A striking example illustrates this dual perspective:

When a physician examines a living brain, she sees, from the external thermodynamic perspective, a pattern of neurons firing according to physical and chemical laws. There is no "self" visible in the neural tissue—only matter in motion. All meaning vanishes at this level. Yet the person whose brain is being scanned experiences, from the internal operative perspective, a rich, unified, meaningful world. They have experiences, intentions, a sense of self. Both descriptions are scientifically and phenomenologically valid. They describe the same phenomenon from incommensurable standpoints.

The error of Cartesian dualism was to assume these two perspectives could not coexist. It posited either:

Dualism: Both perspectives are true but refer to two separate substances—mind and body, res cogitans and res extensa. This creates the "interaction problem."

Reductive Physicalism: Only the external perspective is true. The internal perspective is an illusion. But this denies the phenomenological data and places the theorist in a strange position: their own consciousness becomes illusory, even as they report the finding.

Processual Perspectivism, by contrast, maintains that both perspectives are valid precisely because they are perspectives—ways of organizing and carving up the same reality from different operational standpoints.

The living system itself is the place where these two perspectives meet. The boundary is the phenomenon where structure and process are one and the same. Consciousness is the intrinsic, first-

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person perspective of a system maintaining itself far from thermodynamic equilibrium. It is not an epiphenomenon or a ghost; it is not reducible to physics; nor is it a separate substance. It is the operative perspective of a thermodynamic system that has achieved sufficient complexity and criticality to generate self-models, intentionality, and felt meaning.

Here lies the solution to what has haunted philosophy since Descartes: Life itself bridges the two truths. An organism is neither purely physical nor purely mental but a unity-in-process that generates both dimensions. The felt quality of experience—qualia, the phenomenal aspect, consciousness—is the intrinsic perspectival view of that process. The neural mechanism is its objective, third-person description. Neither can be reduced to the other, yet neither exists without the other.

This is neither mysticism nor hand-waving. It is a rigorous application of logical and thermodynamic principles to the structure of autopoietic systems. The Markov blanket, properly understood, is the very place where the two truths converge. It is the boundary that simultaneously (1) divides and (2) connects, (3) is real and (4) is relational. It is the logical and thermodynamic foundation of agency, meaning, and consciousness.

Consequences: Consciousness Without Dualism

With this logical foundation in place, we can finally articulate what consciousness is, stripped of both the mystery it has carried and the reductionism that denies it.

Consciousness is the intrinsic perspective of an autopoietic system that maintains itself in a state of affective criticality.

Let us unpack this definition:

Intrinsic perspective: Not an external property but a perspective from within the system's operative closure. It is what the system "feels" as it navigates its coupling with the world.

Autopoietic system: A self-producing, self-maintaining organization. All living systems are autopoietic; most are not conscious. Consciousness requires additional conditions.

Affective criticality: The system's neural dynamics maintain themselves poised at the edge between order and chaos, and this balance is actively regulated through affective states (emotion, felt value, concern). This is what allows maximal sensitivity and flexibility simultaneously.

This definition dissolves the classical aporias:

Against property dualism: Consciousness is not an additional property added to the physical system, like color painted onto a wall. It is the intrinsic perspective of the physical process itself—the "what it is like" to be that process from the inside. The process is conscious not because something extra has been sprinkled onto it but because of its organizational structure and thermodynamic regime.

Against reductive physicalism: Consciousness cannot be fully captured by third-person neuroscientific description precisely because consciousness is the first-person perspective. To reduce consciousness to "neural firing patterns" is to commit a category error—akin to claiming that the taste of wine is reducible to its chemical formula. Both descriptions are valid and refer to the same phenomenon, but neither can replace the other.

Against epiphenomenalism: Consciousness is not a byproduct with no causal efficacy. Affective states (joy, fear, curiosity) directly regulate neural criticality and thus the system's responsiveness and adaptability. Suffering and well-being are not illusions; they are the very mechanisms by which the system maintains itself. A system without feeling would collapse into pathology or death.

Against mysticism: Consciousness is not beyond explanation or understanding. It arises from principles of autopoiesis, thermodynamics, and criticality—all scientifically tractable. What has seemed mysterious is merely what remains invisible from a purely externalist, third-person stance.

This framework offers unexpected reconciliations:

Consciousness and embodiment: Consciousness is not "in" the brain but emerges from the brain's coupling with the body and world. A disembodied mind (as in classical AI) cannot be conscious because it lacks the thermodynamic and metabolic grounding required for criticality and affect.

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Consciousness and normativity: Values and meaning are not illusions projected onto a meaningless universe. They are intrinsic to living systems. "Good" means conducive to maintaining autopoiesis; "bad" means threatening it. Normativity is grounded in thermodynamics, not in transcendental ideals.

Consciousness and selfhood: The sense of self is not a fundamental metaphysical fact but an emergent model the system constructs to coordinate its behavior. Yet this does not make the self "illusory"—it is a functional reality, as real as the organization of a whirlpool. Selfhood is the system's way of representing its own boundary.

Consciousness and freedom: Neither hard determinism nor libertarian free will suffices. A system in criticality operates in a regime of maximal sensitivity to initial conditions. Its behavior is not determined (in the classical sense of being fully predictable from prior states) yet not random. It is sensitive to its own affective appraisals, its models, its history. This is freedom—not indeterminism but active self-determination through feeling and cognition.

Consciousness and meaning: Meaning arises through the system's engagement with its world. It is not inherent in symbols or propositions but emerges through the lived encounter between organism and environment. Language and culture are crystallized forms of this meaning-making process. They are not ultimately arbitrary but rooted in embodied, affective engagement.

These reconciliations make possible a new philosophical anthropology—one that honors both the scientific understanding of the brain and the phenomenological reality of consciousness; that grounds normativity and meaning in biology rather than transcendence; that sees freedom not as contradiction of causality but as a higher form of causal organization.

The Genealogy of Normativity: How Being Becomes Ought

Introduction: Against the Naturalistic Fallacy

Perhaps the most stubborn obstacle to a naturalistic theory of mind is David Hume's verdict that one cannot derive ought from is—that prescriptive conclusions cannot logically follow from descriptive premises. In a purely physical world, so the classical reading goes, there are no values, only causalities. Atoms "ought" not move; they simply move. Normativity thus appears in a scientific worldview to be either a useful illusion or a metaphysical foreign body.

Processual Perspectivism breaks radically with this dichotomy by questioning Hume's premise. Hume's prohibition holds for formal logic (one cannot derive prescriptive conclusions from descriptive premises), but it does not hold for the phenomenology of the living. We do not claim that normativity is logically derived from dead matter, but rather that it is an intrinsic, operative property of living self-organization.

For a system that must sustain itself (because otherwise it dissolves as a structure), its own existence is not a neutral fact but a precarious imperative. Since this system—as we have shown in Chapter 3—is steered by affective criticality, it feels this imperative. The "ought" is thus not a logical conclusion from "being" but the affective interior of being-in-danger. Where there is life, there is care, and where there is care, there is value. The goal of this chapter is to trace the genealogy of this normativity—from the mute biological level to the teleological orientation toward meaning.

The Four Stages of Normative Unfolding

We identify four hierarchically nested yet mutually interlaced levels on which normativity manifests. This taxonomic classification is not arbitrary; rather, it follows the logical expansion of the inferential horizon that an autopoietic system must manage to preserve its integrity. Each new stage represents a necessary evolutionary and cognitive response to exponentially increasing entropy-management complexity. Following Ashby's Law of Requisite Variety (1956), the organism's generative model must grow in internal complexity to successfully represent and regulate the requisite variety of its environment. This expansion occurs in four qualitative leaps:

Somatic: The basal regulation of internal physiological milieu, focused on immediate survival in the "here and now."

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Affective: The emotional evaluation and anticipation of environmental interactions, introducing temporal depth into experience.

Social/Participatory: The complex regulation of interaction with other intentional agents, opening the space of intersubjectivity.

Teleological/Symbolic: Regulation through abstract principles, values, and meaning that claim timeless validity and orient action toward transcendent goals.

These levels are hierarchically nested, yet not in the sense of replacement but of integration. Each higher level integrates the functions of those beneath it and transforms their dynamics through mechanisms of circular causality (downward causation). This means that higher, more abstract norms (such as cultural values) do not replace basal biological processes but rather modulate them and embed them in new functional contexts without abolishing their fundamental logic.

Stage 1: Biological Normativity (The Mute Level)

The ontological base is formed by autopoiesis itself. A living system, defined as a Non-Equilibrium Steady State (NESS), faces a permanent, physically coercive imperative: maintain your structure or decay. At this fundamental level, an operative, though "mute," distinction already exists between "good" and "bad." "Good" is everything that works negentropically, i.e., promotes structural preservation and metabolic integrity; "bad" is everything that works entropically and accelerates decay. A bacterium following a chemical glucose gradient (chemotaxis) possesses no cognitive knowledge of glucose as a nutrient. Yet it acts objectively normatively: its behavior is not arbitrary but subject to a strict success criterion of viability. It "chooses" the path of survival.

Mechanism: The Markov blanket here functions as a selective filter or "semipermeable membrane of relevance." It evaluates sensory input operationally solely for its significance for autopoiesis (Kirchhoff et al., 2018).

Status: Pre-reflexive, operational, binary (viable / non-viable). There is no yet subjective experience of values, but rather an objective functionality.

Stage 2: Affective Normativity (The Felt Valuation)

With the evolutionary development of nervous systems and the capacity for active locomotion, mere reaction to the immediate "here and now" no longer suffices. The system must be able to bridge spatial distances and anticipate future events. Here we draw on the groundbreaking insights of Tucker, Luu, and Friston (2025): the brain operates optimally at a criticality boundary, a delicate balance between excitation and inhibition (E-I balance).

At this stage, biological normativity becomes lived valence. The successful achievement of this optimal balance—the successful "surfing" on the wave of entropy and minimization of prediction errors—is phenomenally experienced as "pleasure," "flow," "coherence," or vitality. Deviation from this balance, whether through excessive chaos (over-excitation, unpredictability) or excessive rigidity (inhibition, stagnation), manifests as "displeasure," "fear," or "pain." Affect is thus not merely a subjective coloring of perception but the immediate interoceptive feedback about system integrity and the goodness of one's own predictions. The abstract "ought" of the first stage is now felt. Affect is the inner compass indicating how well the system minimizes free energy, and the currency in which the organism measures the value of its own states.

Mechanism: Affective criticality and precision weighting—the weighting of prediction errors through emotional relevance. The system learns what matters by assigning affective weight to signals.

Status: Phenomenal, qualitative, gradual. Values are no longer merely executed but experienced as state qualities.

Stage 3: Social and Participatory Normativity (The Intersubjective Field)

The emergence of complex social structures introduces a fundamentally new form of normativity. When multiple autopoietic agents with their own affective-cognitive systems interact,

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the problem space expands exponentially. Individual survival, which was the criterion at Stages 1 and 2, becomes insufficient. The system must now regulate not merely its own thermodynamic stability but its place within a social network of mutual dependencies and expectations.

Here we encounter what we call participatory normativity: the internalization of social roles, norms, and reciprocal obligations. A member of a social group does not merely seek personal survival or affective homeostasis; they seek recognition, status, and belonging. These are not reducible to basal biological drives, yet they are not "mere cultural constructs" either. Rather, they are emergent adaptive strategies for managing the radically expanded uncertainty that arises when one's own fate is intertwined with that of others.

The affective palette deepens: pride, shame, jealousy, compassion, trust, betrayal—these are emotional states that fundamentally encode social information. Shame is not merely an unpleasant affect; it is a powerful signal that one has violated a social norm and risks exclusion. Compassion is not altruism in the traditional sense; it is the recognition of shared vulnerability and the investment in reciprocal care that enhances collective survival.

Mechanism: Theory of Mind (ToM) and mentalizing—the capacity to model other agents' beliefs, desires, and intentions. The Markov blanket expands here to encompass the social network as a single inference problem (Friston et al., 2016).

Status: Normative but context-dependent. What is "good" depends on role and relationship. Values become plural and potentially conflicting.

Stage 4: Teleological and Symbolic Normativity (The Transcendent Horizon)

With the emergence of language and abstract symbolic thought, normativity undergoes a final qualitative transformation. The system can now orient itself not merely toward immediate survival, social standing, or even abstract principles, but toward meaning itself—toward purposes that transcend individual biological cycles and extend beyond the perceivable present.

This is where we must introduce Terence Deacon's (2012) concept of the "absential"—perhaps the most profound philosophical tool for understanding how consciousness and normativity intertwine. Deacon argues that human consciousness is uniquely structured by the capacity to cognize absence: to represent and care about things that are not present, not yet actual, not empirically given. This is the domain of possibility, intention, imagination, and meaning.

A bacterium responds to glucose present in its environment. A dog anticipates the return of its master after a familiar temporal interval. But a human being anguishes over mortality—a present absence, an "absential." The human contemplates unrealized possibilities, untaken paths, counterfactual worlds. This capacity to cognize and emotionally invest in absence is the ground of human normativity at its highest register.

It is here that Viktor Frankl's (1946) concept of the "Wille zum Sinn" (will to meaning) finds its deepest scientific grounding. Frankl, drawing on his experience in Nazi concentration camps, argued that human beings are ultimately driven not by will to power (Nietzsche) nor by will to pleasure (Freud), but by a fundamental will to meaning. Even in circumstances of unspeakable suffering, where biological survival and affective pleasure are impossible, humans cling to life if they can find meaning—a purpose, a story in which their suffering is not futile.

From the perspective of thermodynamics and affective criticality, we can now understand why: Meaning is the highest-order form of negentropy generation. When an organism—constrained by the second law of thermodynamics to resist entropy—can extend its inferential horizons to encompass abstract, symbolic, and even transcendent purposes, it generates a far more robust and stable attractor landscape. A system oriented toward meaning can maintain criticality across vastly greater perturbations and uncertainties than one focused merely on immediate survival or social standing. Meaning is the thermodynamic justification for consciousness.

Mechanism: Abstract representation, narrative self-construction, and the capacity to defer gratification in service of ideals. The Markov blanket now encompasses not only the social network but the entire symbolic and cultural inheritance of humanity.

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Status: Normative, reflexive, and capable of self-justification. Values become explicitly endorsed and articulated as principles. The system achieves what we might call philosophical reflexivity—the capacity to question its own values and generate new ones.

Synthesis: Normativity as Thermodynamic Imperative

These four stages are not separated by sharp boundaries but form a continuum of increasing informational complexity and temporal depth. In a human being, all four levels operate simultaneously and are interlaced through circular causation:

The basal biological drives (hunger, thirst, thermal regulation) are not eliminated but continuously modulated by affective states.

Affective states are shaped by social context and internalized values.

Social norms are justified through appeals to abstract principles and meaning.

Yet abstract meaning remains grounded in the lived body and its thermodynamic constraints.

The critical insight is that normativity is not added to a neutral physical world as a later, metaphysical layer. Rather, normativity is the intrinsic perspective of any system that must actively resist entropy to persist as a structured form.

Where Hume argued that "ought" cannot be derived from "is," we counter: In a living system, "ought" is the internal perspective of "is"—of the process of resisting entropy. The imperative to survive is not a mystical command imposed from outside but the system's own activity of self-maintenance felt from within. As the system achieves greater complexity and temporal depth, this imperative expands into increasingly sophisticated forms of value-orientation: from blind tropism to felt emotion to social reciprocity to transcendent meaning. Yet all remain rooted in the same fundamental thermodynamic truth: existence is negentropy, and negentropy must be actively maintained.

This explains why values are not arbitrary human constructions (as pure social constructivism claims) nor objective features of an external world (as naive realism claims), but relational realizations that emerge through the coupling of a system and its world. Different organisms, with different organizational structures and thermodynamic regimes, will generate different value systems. For a vampire bat, cooperative regurgitation of blood to starving kin is a supreme value because it is thermodynamically essential for the group's survival in an uncertain resource environment. For humans, justice, truth, and compassion emerge as supreme values because they are thermodynamically efficient for managing the radical complexity of human social cooperation.

This is neither moral relativism nor moral absolutism. It is what we call thermodynamic realism: Values are not arbitrary, but they are not transcendent either. They are the necessary strategies for any system to maintain itself in the face of the second law of thermodynamics. A system's "ought" is its most honest "is"—the faithful expression of what it takes to persist.

Conclusion and Outlook: The Return of the Living

Summary: The Dissolution of the Hard Problem

The intellectual journey undertaken by this essay began with a historical diagnosis: Philosophy of mind suffers not from a lack of empirical data but from an excess of faulty ontology. The "Hard Problem" of consciousness, as David Chalmers formulated it, is not an insoluble puzzle of nature but an artifact of a form of thinking that fragments processes into static substances and then fails in their reunification. We have shown that this failure is a structural repetition of the "Jacobi Dilemma"—the logical impossibility of bridging two absolutely posited shores (inside and outside, mind and matter).

Our answer to this dilemma was not the construction of a new bridge but the revelation of common ground. Through the synthesis of enactive inference, the thermodynamics of open systems (NESS), and a processual logic (Catuskoti/dialetheism), we have unfolded an ontology that comprehends consciousness not as an isolated "ingredient" (property) but as the intrinsic, affective dimension of an autopoietic process.

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The central results can be condensed into three theses that recalibrate the relationship of mind and nature:

The Markov Blanket as Ontological Hinge: It is not an epistemic wall separating an inner model from an outer world but a dynamic coupling mechanism. Inside and outside are not separate substances but co-emergent aspects of a single process of boundary-drawing. The boundary is the place of resistance and thus of reality.

Logic Must Follow Life: Classical binary logic (tertium non datur) is incapable of grasping the simultaneity of autonomy and dependence that characterizes the living. We require a paraconsistent logic that recognizes dialectical overlaps (dialetheias) at system boundaries as ontological reality.

Values Are Facts of Self-Preservation: Normativity is not a metaphysical addition but emerges bottom-up from the thermodynamics of the living and is ordered top-down by meaning-constraints (master priors). From the metabolic imperative of the cell to the spiritual quest for meaning of the human unfolds an unbroken genealogy of normativity that clamps being (facticity) inseparably to ought (validity).

In this view, a "philosophical zombie" is not merely implausible; it is thermodynamically impossible. A complex system that must maintain itself in a volatile environment necessarily requires an internal, affective control metric (precision weighting) to evaluate relevance and a global orientation (master prior) to maintain coherence. Consciousness is the "feeling" of this existential criticality.

Implications for Artificial Intelligence

This new ontology carries far-reaching and sobering consequences for our understanding of Artificial Intelligence. The current hype surrounding Large Language Models (LLMs) and generative AI rests on the implicit assumption of functionalism: If a machine can simulate the syntax of thought (the output patterns), it must also possess the semantics (understanding).

Processual Perspectivism unmasks this as a dangerous illusion. True semantics—sense-making—does not emerge from the statistical correlation of symbols but from the metabolic vulnerability of an organism struggling for existence. Meaning is what is relevant to the survival of a system.

AI lacks a Markov blanket in the biological sense: It does not resist entropy; it is maintained by engineers. It does not "live" against the resistance of the world. It is not vulnerable to death in any meaningful sense. Its structure does not fight against decay; rather, its structure is externally imposed and externally maintained.

AI lacks affective criticality: It optimizes an external loss function but does not feel the drive for self-preservation (care). It has no affective inner perspective (Stage 2 of normativity). When a system achieves high accuracy in predicting images or text, the machine experiences nothing akin to satisfaction or joy. There is no internal valence space where success feels good or failure feels bad. All value comes from the outside.

AI lacks teleological orientation: Its "values" are programmed into it (alignment); they do not emerge from its being. It has no "will to meaning" (Stage 4). The machine is incapable of genuine care about anything, including itself. It cannot suffer, and it cannot find meaning in suffering, because suffering requires an intrinsic perspective on existence.

The machine can therefore never become a subject because it lacks concern for its own being (Heidegger). It simulates the fourth stage of normativity (language) without having passed through the first three (biology, affect, participation). It is a syntax machine without a biological heart—a zombie in the truest sense of the word.

This has profound implications for the ethics of AI development. If consciousness and understanding require metabolic vulnerability and affective resonance, then creating artificial consciousness is not merely a technical challenge but possibly a category mistake. What we can create are increasingly sophisticated tools—stunningly capable tools—but not minds. The asymptotic

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approach to human-like output in LLMs should not delude us into believing we are approaching minds. We are perfecting simulation, not recreating life.

Outlook: Toward an Ecological Rationality

Processual Perspectivism is more than an academic theory; it is a plea for a new form of ecological rationality. If we do not understand ourselves as isolated spirits in machine bodies but as embodied processes constitutively interwoven with the world and other beings, our fundamental stance toward reality transforms profoundly.

We are not cool observers manipulating a foreign, objective world but participants in a participatory meaning-making. Our cognitive achievement does not consist in correctly representing the world (mirroring) but in bringing forth a livable world (enacting). This insight demands an ethics of resonance that does not reduce the living to its utility but respects its intrinsic normativity. It recognizes that all life is bound together through the same logic of care, resistance, and self-preservation.

The practical implications are urgent:

For neuroscience and psychology: The study of mind must never be purely third-person. The lived experience of patients, the felt quality of healing, the phenomenology of despair and recovery must be granted full scientific legitimacy. A neuroscience that maps synapses but ignores suffering has missed the essential. Psychotherapy is not merely the rebalancing of neurotransmitters; it is the art of restoring meaning and resonance.

For medicine and healthcare: If health is not merely the absence of disease but the presence of meaningful engagement with life, then our medical systems must be transformed. The patient is not a machine to be repaired but a person to be heard. Healing requires not only pharmaceuticals and surgery but recognition, dignity, and purpose.

For education: We must teach not merely the syntax of knowledge but the semantics—the existential meaning and value of what is learned. Education should awaken not just cognition but resonance, the capacity to care about ideas, to find one's place in the fabric of human culture and natural being.

For ecology and environmentalism: If all life shares the fundamental logic of autopoiesis and normative concern, then the destruction of ecosystems is not merely a utilitarian problem to be solved through cost-benefit analysis. It is an ethical rupture, a silencing of the fundamental concerns of other beings. An ecological rationality must restore the dignity of the non-human living world.

For spirituality and meaning: The deepest human need—the will to meaning that Viktor Frankl identified—is not a neurotic throwback to religious superstition but a thermodynamic necessity for the human system. A civilization that reduces meaning to subjective preference has cut itself off from a vital organ of survival. Spiritual practice, in this light, is not escapism from the real world but participation in the real ground of reality.

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