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Meaning as Temporal Integration: A Neurocognitive Extension of the Resonance-Inference Model via the Spiritual Self-Pattern

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Abstract

Contemporary psychotherapy faces a profound paradox: while empirical evidence confirms the clinical significance of spirituality for resilience, established theoretical frameworks often lack a process-based mechanism to integrate this dimension beyond narrative content or cultural coping. This article addresses this gap by introducing a "spiritual self-pattern" into the Resonance-Inference Model (RIM), conceptualizing it not as a metaphysical construct, but as a fundamental neurocognitive imperative for biological self-organization. Drawing on the Free Energy Principle and spatiotemporal neuroscience, we define the spiritual self-pattern as the system's highest-order regulator, instantiated within the brain's slowest Intrinsic Neural Timescales (INTs). These deep temporal structures function as "long-term priors," integrating sensory and emotional data over vast durations—akin to the psychic "climate" that contextualizes the "weather" of momentary affect. We posit that this pattern maintains mental health by modulating the E-I balance (Excitatory-Inhibitory criticality) between predictive confidence (elation) and corrective sensitivity (anxiety) via top-down precision weighting. Within this framework, "meaning" is redefined as the successful integration of sensory chaos into these long-term temporal models, preserving the functional integrity of consciousness against existential entropy. We distinguish spiritual resonance—a state of "Bayesian binding" characterized by metastable synchronization—from spiritual dissonance, where pathological precision leads to the "frozen priors" seen in fanaticism or the systemic collapse of existential despair. By shifting the focus to mechanisms of temporal integration, this model offers a precise grammar for spiritually integrated psychotherapy, framing the therapist as a "criticality manager" dedicated to restoring the client's capacity for global self-organization.

Keywords: psychotherapy integration; free energy principle; criticality; active inference; resonance; synergetics; spirituality; self-pattern theory; E-I balance

Public Significance Statement

In an era increasingly perceived as fragmented and disenchanted, many individuals turn to spirituality as a vital resource during existential crises . However, spirituality can be a double-edged sword, at times providing profound strength and at others fueling rigid dogmatism or "spiritual bypassing" . This paper proposes a scientific model that explains how the human search for meaning and connection is deeply anchored in the temporal architecture of the brain.

We show that psychological well-being relies on a delicate balance between a forward-striving system (linked to confidence) and a corrective system (linked to caution). One might imagine a tightrope walker: excessive confidence leads to a fall, while excessive fear causes paralysis; only in perfect balance can they move safely . Our model suggests that spiritual needs function as a "temporal anchor" or a "cognitive gyroscope," allowing the brain to embed immediate suffering into a broader, life-encompassing context of meaning. By understanding "meaning" as the brain's ability to bind time and experience into a coherent whole, therapists can better support clients in regaining their resilience and finding a state of deep, dynamic resonance with the world .

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Introduction: The Need for a Neurocognitively Grounded Integration of Spirituality in Psychotherapy

The Under-Illuminated Dimension: Spirituality in Theories of Change

Contemporary psychotherapy operates within a fundamental paradox. On the one hand, empirical evidence increasingly demonstrates the clinical relevance of spirituality for mental health, resilience, and recovery. In a world increasingly perceived as crisis-ridden, fragmented, and "disenchanted" (Rosa, 2016), the search for meaning has migrated from the pews of established religion to the consulting rooms of therapists. A significant majority of clients identify as spiritual, utilize spiritual practices as central coping resources during existential crises, and explicitly express the desire to integrate these dimensions into the therapeutic process (Pargament, 2007). Spirituality acts for many as a buffer against the entropy of modern existence, providing a coherent narrative framework where secular models often fall short.

On the other hand, a significant gap persists between this clinical reality and the prevailing theoretical models of psychotherapy. While "third-wave" therapies have successfully integrated mindfulness, they often strip it of its ontological commitments, reducing it to a technique for stress reduction. Many established approaches lack an adequate process-based framework to integrate the role of spirituality beyond mere phenomenological acknowledgment or its categorization as a "resource." Consequently, therapists often lack the conceptual tools to distinguish between healthy spiritual striving and pathological evasion.

This gap becomes particularly evident when analyzing the complex, double-edged nature of spiritual coping. While spiritual resources are a profound source of strength, they can, under specific neurocognitive conditions, exacerbate psychological distress. Phenomena such as "spiritual bypassing"—where spiritual ideas are used to avoid facing unresolved emotional issues—or the rigid dogmatism found in fundamentalist structures illustrate that spirituality is not inherently benign (Masters, 2010). A Zen master might use his practice to pathologically repress a deep childhood trauma of abandonment via attentional control, rather than healing it. These nuanced findings underscore the inadequacy of simplistic "spirituality is good" models and call for a theoretical explanation that can capture both the healing and potentially harmful aspects of spiritual processes in a rigorous, process-based manner (Britton, 2019). What is needed is a model that explains *why* and *how* spirituality works mechanistically—not just what it feels like.

Criticality: The Threshold between Order and Chaos as a Principle of Life

To develop such a model, we require a fundamental organizational principle capable of mapping the immense complexity of psychic processes without reductionism. This principle is found in the concept of criticality. Originally derived from the statistical physics of phase transitions (Stanley, 1971), criticality describes the unique state of a system poised at a tipping point—such as the exact moment water freezes into ice or a magnet gains its field. At this "critical point," the system exhibits properties of scale-invariance, maximum information transmission, and extreme sensitivity to external stimuli. It is neither trapped in the rigid order of a crystal (sub-critical) nor dissolved in the pure chaos of a gas (supra-critical).

The theory of Synergetics (Haken, 1991)—the science of self-organization—posits that living systems self-organize towards this state to maximize adaptability. In the context of the brain, neuroscientists like Beggs and Plenz (2003) have empirically demonstrated that healthy neural networks operate precisely at this edge. The propagation of neural activity occurs in the form of "neuronal avalanches," whose size distribution follows a power law—a clear fingerprint of a system operating at the edge of chaos. This state allows the brain to be locally segregated (functional specialization) yet globally integrated (functional connectivity), providing the optimal substrate for complex computation.

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For psychotherapy, this concept is transformative. Mental illness can be reconceptualized not as a "chemical imbalance" or a "wrong thought," but as a deviation from criticality. Depression represents a sub-critical state: highly ordered, rigid, and insensitive to new information (a "frozen" system). Mania or psychosis represents a supra-critical state: highly disordered, hypersensitive, and unable to sustain stable representations (a "chaotic" system). Therapeutic change, then, is the art of moving the system back to the critical point where phase transitions—profound psychological shifts—become possible.

The Neurocognitive Key: E-I Balance and the Criticality of Consciousness

The decisive mechanistic answer to *how* this optimal state is maintained is provided by Tucker, Luu, and Friston (2025) in their groundbreaking theory on the criticality of consciousness. They elevate the concept from neural dynamics to a psychological principle, postulating that this optimal operating state is maintained by a dynamic equilibrium between two fundamental, affectively charged control systems rooted in distinct limbic architectures:

The Excitatory (E) System:

- *Function:* This system acts predictively and is future-oriented. It generates the psychological "thrust" to engage with the world based on prior expectations.
- *Neurobiology:* It is associated with the dorsal limbic Papez circuit (including the hippocampus and anterior thalamus).
- *Phenomenology:* It is linked to the core affect of elation (confidence, joyful arousal, agency). When dominant, it strengthens confidence in existing predictions (priors), effectively saying, "I know what this is, and I can handle it."

The Inhibitory (I) System:

- *Function:* This system acts correctively and is past-oriented (or present-focused on discrepancies). It halts automaticity to process novelty or danger.
- *Neurobiology:* It is linked to the ventral limbic **Yakovlev circuit** (including the amygdala and orbitofrontal cortex).
- *Phenomenology:* It is associated with the core affect of **anxiety** (caution, inhibition, doubt). When dominant, it increases the gain on prediction errors, compelling the system to update its models: "Wait, something is wrong; look closer."

The state of E-I criticality is thus the narrow, highly adaptive corridor in which these two opposing forces counterbalance each other perfectly. The brain unfolds its maximum capacity for complex information processing here because it is confident enough to act (E) but sensitive enough to learn (I). Elation and anxiety are not mere epiphenomena or "feelings to be regulated," but are the central control parameters that regulate the system's information-theoretic precision.

Beyond Metaphor: The RIM and the Architecture of Temporal Integration

The Resonance-Inference Model (RIM; Leidig, 2025) represents a paradigm shift: it conceptualizes psychotherapy not as the mechanistic repair of defective parts or mere cognitive reprogramming, but as the restoration of the conditions necessary for dynamic self-organization. Within this framework, psychopathology is understood as *dissonance*—the pathological persistence of the psychic system in stable but maladaptive attractor states, which are either sub-critical (rigid, depressive) or supra-critical (chaotic, manic-anxious). Neurocognitively, this dissonance is characterized by a chronic imbalance between two fundamental imperatives of consciousness: predictive confidence (Excitatory, E), which guarantees stability, and error correction (Inhibitory, I), which enables adaptation. Therapeutic change is thus to be understood as *resonance*: a synergetic phase transition that releases the system from stagnation and guides it back into the state of

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criticality—that narrow, high-energy corridor at the "edge of chaos" (Beggs & Plenz, 2003) where maximum information processing and adaptivity become possible.

However, the central thesis of this article is that this synergetic architecture remains incomplete and clinically insufficient as long as it regards the self merely as a product of social interaction or as a narrative construct. Narratives are volatile; they can be easily shattered by traumatic evidence. To explain the profound stability required to integrate existential crises (massive prediction errors), we must extend the model. Building on the *Pattern Theory of Self* (Gallagher, 2013) and grounded in recent findings in *Spatiotemporal Neuroscience* (Northoff, 2023), we postulate the necessity of a Spiritual Self-Pattern.

We define this pattern here not metaphysically, but with neurocognitive precision as a necessary functional layer of the neural architecture: it is the domain of the slowest intrinsic neural timescales (INTs). While sensory areas operate in the millisecond range, these deep cortical structures (such as the Default Mode Network) integrate information over vast periods, functioning as ultimate "long-term priors" (Hardstone et al., 2021). These priors do not encode specific object properties, but global parameters of coherence, connection, and teleology ("meaning"). They constitute the "temporal backbone" of the self.

As we will demonstrate, integrating this dimension is not an optional luxury for religiously inclined clients, but a neurobiological imperative for sustainable change. Without the stabilizing top-down modulation of these "deep" temporal models, the system lacks an anchor in stormy seas: the E-I balance of lower hierarchical levels collapses into dissonance under stress, as short-term sensory variance can no longer be embedded into a long-term context. Viktor Frankl's "Will to Meaning" (1946/2009) is thus not a philosophical demand but translates directly into the neuronal necessity to bind sensory chaos through long-term temporal integration, thereby preserving the functional integrity of consciousness.

The Architecture of the Resonance-Inference Model: A Framework for Criticality

The RIM synthesizes six theoretical pillars into a coherent whole. It is not an eclectic collection but a functional architecture where each pillar closes a specific explanatory gap left by the previous one, building a complete picture of the mind from the neuron to the search for meaning.

The Computational Grammar: Friston's Free Energy Principle (FEP)

How can the existential search for meaning be formally described within a predictive processing framework? The FEP provides a universal grammar, conceptualizing the brain as a prediction machine (Clark, 2016) whose ultimate goal is to minimize variational free energy—a proxy for surprise or prediction error (Friston, 2010). This process necessitates a continuous trade-off between model accuracy (how well the model explains specific data) and model complexity (how simple and generalizable the model remains) .

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In this context, the spiritual self-pattern emerges as the ultimate mechanism for complexity reduction. Meaning is not merely a narrative layer, but a high-level "temporal smoothing" function . By leveraging the slowest intrinsic neural timescales (INTs), the system integrates transient, high-frequency prediction errors—the "noise" of daily stressors—into a stable, long-term generative model (Northoff, 2023) . A coherent spiritual prior provides a simplified, low-complexity framework that explains a vast array of disparate experiences. Thus, the search for meaning is formally understood as the attempt to find an optimal compromise between high-level predictive confidence (E), regulated by the dorsal limbic system, and a nuanced, corrective openness to life's contingencies (I), effectively binding chaotic sensory variance into a resilient temporal continuum (Tucker, Luu & Friston, 2025).

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The Phenomenological Substrate: Gallagher's Embodied Self-Pattern

What constitutes the "self" that engages in this temporal integration? Gallagher's 4E cognitive model (embodied, embedded, enacted, extended) posits that the self is not a static entity but a processual, emergent pattern (Gallagher, 2013). The extension to the 4E+E model recognizes emotion as a constitutive regulatory force, where the control dynamics of the self-pattern are maintained by the affectively charged E-I balance (Tucker, Luu & Friston, 2025) .

We propose that the spiritual self-pattern acts as the vital bridge between the immediate, pre-reflective presence of the body and the vast horizons of existential meaning. While the minimal and ecological self-aspects operate primarily on rapid timescales to facilitate immediate action, the spiritual pattern allows the self to transcend the "tyranny of the now" . By recruiting the brain's slowest INTs, it enables a form of "temporal expansion," embedding the embodied experience of the present into a teleological and historical context (Northoff, 2023) . Within this framework, spirituality is not an abstract belief but a structural mode of organization: it is the dynamic effort to maintain global coherence across all self-aspects . Consequently, a "crisis of meaning" is redefined as a structural fragmentation—a state where the self-pattern loses its temporal depth, resulting in a felt sense of alienation from one's own bodily experience (Gallagher, 2005) .

The Energetic Drive: Ciompi's Affect Logic

What role do feelings like awe or existential anxiety play? Ciompi's affect logic posits that affects are the primary organizers of cognition (Ciompi, 1997); they act as the "glue" linking thoughts and perceptions. Tucker et al. (2025) radicalize this by assigning a computational role to core affects: they are the control signals steering the precision of priors and evidence. *Integration:* Global spiritual affects such as awe, wonder, or oceanic boundlessness are phenomenological markers of a state of optimal E-I criticality (cf. Keltner & Haidt, 2003). In awe, we simultaneously feel the vastness of the stimulus (high I-input/accommodation) and a sense of connection (E-stability). Existential anxiety, conversely, marks a massive E-I imbalance—a state of high free energy where the system is overwhelmed by prediction errors it cannot bind.

The Neurobiological Correlate: Northoff's Spatiotemporal Neuroscience

How is the meaning-seeking self-anchored in the brain? Northoff shifts the focus from the mind-body problem to the world-brain problem (Northoff, 2014a). Consciousness arises from the spatiotemporal "alignment" of the brain's intrinsic activity (its resting state rhythms) with the statistical structure of the environment. A healthy self flexibly synchronizes its internal rhythms with the rhythms of the world. *Integration:* Spiritual practices are techniques for the conscious regulation of this world-brain alignment. They are not a retreat from the world but a deepening of synchronization. By modulating the intrinsic neural timescales (slowing down internal rhythms), practices like meditation allow the brain to align with slower, more fundamental environmental rhythms, generating a felt sense of "oneness."

The Teleological Foundation: Grawe's Basic Needs

Why is the search for meaning so fundamental? Grawe's consistency theory posits universal psychological basic needs (attachment, control, self-esteem, pleasure) as high-level priors (Grawe, 2004). The consistent extension of this logic suggests the existence of a meta-level. *Integration:* The spiritual needs for meaning, purpose, and connection are the ultimate priors because they provide the context for all other needs. A coherent life meaning provides superordinate stability. It functions as a "gyroscope": The violation of a subordinate need (e.g., losing a job) does not lead to systemic collapse if it can be integrated into a larger context of meaning (e.g., "This is a trial that strengthens me").

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Synthesis and Integration: The Spiritual Self-Pattern as Regulator of Criticality

The six pillars of the RIM, realigned through the lens of E-I criticality, merge into a coherent model. This model allows for the integration of spirituality by distinguishing between a change in the story we tell ourselves and a fundamental reorganization of the storyteller itself.

The Markov Blanket: The Boundary between Self and World

A central concept from Friston's theory is the Markov blanket, the informational boundary between an organism (its internal states) and its environment (the external states). It is not a physical wall but a statistical membrane that separates and simultaneously connects the self from the world. It consists of:

- Sensory states: All perceptions that act upon the self from the world (inputs).
- Active states: All actions with which the self-acts upon the world (outputs).

The self only knows the world through the filter of its sensory blanket and can only influence it through the tools of its active blanket. The E-I criticality described by Tucker et al. (2025) is the optimal state of information exchange at this boundary—the perfect, vibrant balance between holding on to internal models (priors, regulated by E) and being open to new sensory evidence (prediction errors, regulated by I).

Two Paths of Change: The Narrative and the Spiritual Self

The introduction of the Markov blanket allows for a crucial differentiation between two fundamentally different paths of therapeutic change:

- Path 1: Changing the Narrative Self (Local Optimization). This path, taken by many established therapies such as Cognitive Behavioral Therapy (CBT), aims to change the *content* of the narrative self. This is the story that the internal states tell about themselves: "I am worthless," "I must be perfect." CBT interventions operate *on* the Markov blanket but leave its basic structure and permeability intact. Cognitive restructuring directly questions the story. The goal is a better, more accurate model within the existing boundaries between self and world. One rearranges the furniture in the room to improve the flow.
- Path 2: Changing the Spiritual Self-Pattern (Global Reorganization). This path, characteristic of profound transformations often described as spiritual, aims to change the *structure* of the spiritual self-pattern. This is not just about a better story, but about a change in the storyteller. This process involves a phenomenologically experienced weakening or temporary dissolution of the Markov blanket itself. Experiences of "oneness," transcendence, or what (Laukkonen, R., Friston, K. J., & Chandaria, S., 2025) describe as "Bayesian binding" at a global level, are precisely this: a temporary collapse of the rigid informational boundary between self and world. In the vocabulary of the FEP, this corresponds to a drastic, temporary reduction in the precision of those ultimate priors that define the self-boundary. One tears down the walls of the room and reconceives it as part of a larger, open landscape. While CBT performs a local optimization, spiritual experience enables a global reorganization through the mechanism of criticality.

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The Spiritual Self-Pattern: Precision Regulation and Temporal Integration

To avoid conceptual inflation, we must mechanistically define what constitutes this "spiritual self-pattern" and how it regulates the system. The answer lies in the temporal structure and the nature of causality.

From Hierarchy to Dynamic Gestalt: The Mechanism of Integration

Shaun Gallagher's *Pattern Theory of Self* (2013) revolutionized our understanding of the self by deconstructing it not as a monolithic entity, but as a complex, decentralized cluster of interacting aspects: the minimal self (immediate, pre-reflective bodily perception), the ecological self (situatedness in the physical environment), the interpersonal self (social resonance and intersubjectivity), and the narrative self (biographical identity extending over time). Yet, as elegant as this phenomenological description is, it leaves a critical gap often referred to as the "binding problem" of the self, a conundrum that has haunted both philosophy and neuroscience: What neurocognitive mechanism ensures that these disparate aspects—from visceral gut feelings (minimal self) to abstract life histories (narrative self)—do not disintegrate into fragmented, unrelated parts but appear as a coherent, lived unity, a "Gestalt"? Critics have rightly noted the absence of the "glue" that holds this cluster together in a unified field of experience.

To definitively close this explanatory gap, we draw upon two groundbreaking concepts from contemporary cognitive science: Ramstead's model of circular causality (2018) and Lucia Melloni's research on the Global Neuronal Workspace (Melloni et al., 2021).

First, we must abandon the notion of a linear command structure. We define the relationship between the spiritual self-pattern and other components not as a rigid military hierarchy where "mind" commands "body" in a unilateral fashion. Instead, the system operates through circular causality. The spiritual pattern (acting as a high-level prior for meaning and coherence) modulates the precision weighting of the underlying narrative and sensory layers (top-down constraint). It sets the "gain" or volume on what is considered relevant. Simultaneously, these lower layers continuously send prediction errors (sensory surprises, affective dissonances) upward, informing and potentially updating the spiritual pattern (bottom-up update). Ramstead describes this interplay as a "dynamic gestalt" where layers mutually condition one another in a continuous loop: a deep, embodied belief in meaningfulness (spiritual) can top-down dampen the precision of nociceptive signals, effectively reducing the subjective perception of pain (minimal). Conversely, chronic, unbearable pain or trauma (minimal) generates such massive, persistent prediction errors that they can eventually break through the top-down suppression, destabilizing and forcing a rewriting of the construct of meaning itself.

Second, we identify the physical mode of this interaction as metastable integration. The spiritual self-pattern is not a localized module or a "ghost in the machine" residing in a specific brain region. Based on Melloni's work on consciousness formation through neural synchronization, we postulate that it is a global state of synchronization. Disparate self-aspects—for example, a current bodily sensation of tension (minimal) and a narrative memory of past failure (narrative)—are temporarily elevated into the Global Neuronal Workspace via synchronous oscillations. This typically involves the coupling of slow theta rhythms (which facilitate long-range integration across distant brain areas) and fast gamma rhythms (which bind local features into coherent percepts).

In this light, spirituality is neurocognitively understood as "Bayesian Binding" at the highest level of abstraction (Laukkonen et al., 2025). It is the cognitive event where the brain infers a "hidden cause" (a meaning, a purpose, a divine order) that suddenly and elegantly explains a multitude of seemingly unrelated, chaotic data points (pain, loss, hope, chance) within a single, coherent generative model. When a client, for example, realizes in a moment of insight that their current suffering (minimal) and biographical ruptures (narrative) are not random accidents but part of a necessary maturation process (spiritual), a physical "binding" occurs. The system's free energy (uncertainty/entropy) collapses because a model has been found that integrates all data points without residue. The spiritual self-pattern is thus the active process that embeds the fragments of the

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self into a meaningful whole, thereby securing the functional unity and continuity of the organism against the entropy of life.

The Neurocognitive Mechanism: Long-term Priors and INTs

The mechanistic basis of this pattern is formed by two principles that explain how the system maintains stability in a chaotic world:

- Intrinsic Neural Timescales (INTs) as the Foundation of Meaning Construction: According to Georg Northoff's (2023) spatiotemporal psychopathology, the functional hierarchy of predictive processing is not abstract software, but is physically implemented in the fine architecture of neuronal timescales. While sensory areas (e.g., the visual cortex) fire in extremely short time windows (milliseconds) to react to fleeting environmental stimuli, higher associative areas—particularly the Default Mode Network (DMN) and the medial prefrontal cortex—operate at extremely slow frequencies (seconds to minutes). We postulate that the spiritual self-pattern correlates with the longest physiologically available timescales. It functions as the ultimate temporal integrator. Analogous to the difference between weather (short-term, chaotic) and climate (long-term, stable), this pattern integrates sensory and emotional data points over vast spans of time—often across the entire lifespan. These "Deep Temporal Models" (Friston et al., 2017) are evolutionarily critical: they allow the organism to endure momentary chaos or acute suffering by contextualizing these states as transient fluctuations within a stable, long-term trajectory. Neurobiologically, "meaning" is nothing other than the successful integration of an event into an extremely long temporal pattern, whereby the immediate, threatening salience of the moment ("This pain is everything") is relativized and absorbed into a larger continuity.
- Top-Down Modulation as the "High-Level Regulator" of E-I Balance: The second pillar is the causal architecture. As Hardstone et al. (2021) empirically demonstrated, perception is massively controlled by "long-term priors" that act upon the visual cortex via extensive feedback loops from temporal and frontal areas. A spiritual prior—such as a deep, embodied trust in a fundamental order or safety ("primal trust")—functions here as the supreme control parameter. Its primary neurocognitive task is the modulation of precision weighting. In the language of the E-I model by Tucker et al. (2025), this means: the spiritual prior decides how much "truth value" (precision) is assigned to current prediction errors. When a person suffers a stroke of fate (a massive prediction error that alarms the I-system/anxiety), a strong spiritual prior prevents the system's collapse. It "dampens" the precision of the error signal not through denial, but through embedding: "This is painful, but it does not destroy my model of the world." As a result, the E-system (elation/confidence) remains capable of action. The spiritual prior acts like a cognitive gyroscope that stabilizes the E-I balance, even when external conditions threaten to force the system into sub-criticality (depression) or supra-criticality (panic).

Redefinition of Dissonance and Resonance

- Spiritual Dissonance: A state of chronic E-I imbalance at the highest level of the self-pattern. This results in persistently elevated free energy. Either the system rigidly clings to false priors (too much E, e.g., in fanatical dogmatism), refusing to update its model, or it is overwhelmed by prediction errors and uncertainty (too much I, e.g., in existential despair), unable to form a stable model. This is the process-based correlate of spiritual struggles.

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- Spiritual Resonance: A synergetic phase transition into a state of E-I criticality. This is a highly complex, stable, and energetically favorable attractor state that offers maximum flexibility and coherence. Subjectively, this state is experienced as peace, meaningfulness, and deep connection—the state in which the self experiences itself as both autonomous (differentiated) and part of a larger whole (integrated).

Differentiation: Spirituality, Religion, and the Limits of Value Work (ACT)

Precise clinical application requires a sharp differentiation of this model from established constructs and a critical examination of its potential pathological derailments. In particular, distinguishing it from Acceptance and Commitment Therapy (ACT) and analyzing religious pathologies ("frozen priors") is essential to clarify the specificity of the "Spiritual Self-Pattern."

Differentiation from Acceptance and Commitment Therapy (ACT)

Both RIM and ACT are intensely concerned with values and utilize the concept of "Self-as-context." At first glance, the approaches appear convergent. However, a deeper neurocognitive analysis reveals a crucial mechanistic difference in how dissonance is handled:

- ACT (Precision Attenuation): The "Self-as-context" in ACT functions primarily as an observational stance ("I *have* the thought that I am worthless, but I *am* not the thought"). Neurocognitively, this corresponds to the mechanism of precision attenuation (Constant et al., 2021). The therapeutic goal is to ignore the "noise" of negative self-narratives or painful emotions by training the system to actively reduce their predictive power (precision). The signals are not erased, but they lose their weight; they become "background noise." The self distances itself from the content of the experience ("defusion") to remain capable of action. Metaphorically speaking, the client learns to observe the storm without getting wet.
- RIM (Precision Modulation & Integration): The RIM and the concept of the spiritual self-pattern go a decisive step further. It is not merely about observing (attenuation), but about actively integrating and reevaluating the experience through a superordinate model. The spiritual self-pattern utilizes precision modulation (Tucker et al., 2025) not just to tolerate dissonance (the prediction error), but to use it as necessary information for a higher-order organization. A stroke of fate is not just "accepted" (as in ACT) but is re-contextualized within the framework of a spiritual narrative (e.g., "suffering as transformation"). This changes the *nature* of the signal itself. The error is minimized by expanding the generative model ("resonance"). While ACT teaches observing the waves, RIM teaches realigning the ship and setting the sails to harness the energy of the waves for one's own propulsion (finding meaning).

The Pathology of Dogma: "Frozen Priors" and Spiritual Narcissism

Spirituality is by no means a panacea. Religiosity can derail pathologically and massively exacerbate suffering. The RIM offers a precise mechanistic explanation for this: the phenomenon of "Frozen Priors."

In a healthy system, the spiritual self-pattern resides in a state of criticality: it offers strong, trusting orientation (high E-activity) while simultaneously remaining sensitive to massive corrections by reality (sufficient I-activity). In pathological forms, often clinically manifest as spiritual narcissism or fanaticism, this balance tips. A specific belief (e.g., "Only my group will be saved," "My illness is a punishment from God") is assigned pathologically high precision—it becomes a "High Precision Negative Prior" (Paulus, Feinstein, & Khalsa, 2019). The system decouples from sensory reality.

This state is neurobiologically highly dangerous:

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- Immunization against Prediction Errors: Because absolute precision is ascribed to the prior, any deviating information (e.g., logical counterarguments, the suffering of others) is not used as an occasion for learning (model update), but is actively suppressed or reinterpreted. The I-system (correction/anxiety) is functionally silenced.
- Supra-critical Rigidity: The system persists in a supra-critical, hypersynchronous state (Moutoussis et al., 2021). Outwardly, it appears extremely stable and self-assured (excessive E), but internally, it is extremely fragile. Since adaptation no longer takes place, the system must expend increasing amounts of energy to maintain the discrepancy with reality.

True spiritual resonance differs fundamentally from this dogmatism. It is characterized by the capacity to hold deep convictions (high E-stability, "faith") while *simultaneously* possessing the humility to let life surprise and correct one (high I-sensitivity, "openness"). Resonance is flexible; dogma is brittle.

The Psychopathology of Disturbed Criticality

When the spiritual self-pattern fails as the supreme regulator of the E-I balance, this manifests as psychopathology. Dissonance is no longer an abstract disorder but concretely experienced suffering. To bridge the gap between abstract mechanism and clinical reality, Table 1 maps phenomenological states to their specific neurocognitive process markers (INTs, Precision, E-I Balance), distinguishing between deficit (despair), excess (fanaticism), and health (resonance).

Table 1. Neurocognitive Markers of Spiritual Dissonance and Resonance.

Phenomenological State	**RIM Construct / Attractor State**	**Neurocognitive Mechanism (Precision & INTs)**	**Observable Process Markers (Clinical Signs)**	**Therapeutic Strategy (Criticality Management)**
Existential Crisis *(Meaninglessness)*	**Sub-critical State** Spiritual Dissonance (Type I > E) *Correction dominates Confidence.*	**Hyper-Plasticity / Short INTs** System is overwhelmed by Prediction Errors (High Precision on Error). **Temporal Failure:** System is "stuck in the now/past"	**Physiology:** Slumped posture, low arousal, psychomotor retardation. **Cognition:** Ruminative loops, inability to project into the future.	**Restore Confidence (E↑)** Strengthening Long-term Priors through Resource Activation. Using ritual/structure to artificially extend INTs.

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Phenomenological State	RIM Construct / Attractor State	Neurocognitive Mechanism (Precision & INTs)	Observable Process Markers (Clinical Signs)	Therapeutic Strategy (Criticality Management)
		(Northoff). Lack of stabilizing Long-term Priors.	**Affect:** Anxiety, despair, feeling of fragmentation.	*Goal: Reduce precision on errors, stabilize the "narrative spine".*
Spiritual Narcissism *(Fanaticism)*	**Supra-critical State** Spiritual Dissonance (Type E > I) *Confidence suppresses Correction.*	**Frozen Priors / Decoupled INTs** Pathologically high precision on specific Priors (Dogma). **Top-Down Suppression:** All Prediction Errors (Reality) are ignored. System creates a "closed loop" independent of environmental rhythm.	**Physiologie:** Rigid/tense posture, "shining eyes" but lack of contact, pressured speech. **Cognition:** Monologues, immunity to contradiction, binary thinking (Good/Evil). **Affect:** Grandiosity, ecstatic drivenness, lack of empathy.	**Restore Correction (I↑)** Gently introducing "Reality Checks" (Socratic Dialogue). Mindfulness to increase sensory precision (Bottom-Up). *Goal: Destabilize the "Frozen Prior" to allow for evidence integration.*

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Phenomenological State	RIM Construct / Attractor State	Neurocognitive Mechanism (Precision & INTs)	Observable Process Markers (Clinical Signs)	Therapeutic Strategy (Criticality Management)
Spiritual Resonance *(Flow)*	**Metastable State** E-I Criticality (E ≈ I) *Dynamic Equilibrium*.	**Optimal INT Alignment / Bayesian Binding** Flexible Modulation of Precision. **Synchronization:** Long-term Priors (Meaning) provide stability, while remaining open to sensory updates (Life). Sync of internal/external rhythms.	**Physiology:** Fluid gestures, coherent prosody, physiological coherence (HRV). **Cognition:** Perspective flexibility, humor, paradox tolerance. **Affect:** Deep peace, connectedness, "felt sense" of meaning.	**Maintenance & Deepening** Cultivating Metacognitive Awareness of the E-I balance. Establishing practices (meditation, prayer, art) that train the capacity for Metastable Integration.

The Clinical Practice of Criticality Management

The conceptual shift from narrative construction to temporal integration and precision modulation fundamentally alters the role of the therapist. In the extended RIM, the therapist is no longer merely an empathetic listener or a cognitive technician, but functions as an external regulator of intrinsic neural timescales (INTs). They are a "criticality manager" whose primary task is to sense the client's E-I balance and design the therapeutic process to restore the system's capacity for *Bayesian Binding*—the ability to bind chaotic sensory information into a coherent, meaningful whole. This process is less about "fixing" symptoms and more about curating the conditions for a healing self-organization, allowing the system to emerge from rigid, painful attractors.

To illustrate this revised three-phase process, we introduce the case of Mr. K., a 42-year-old architect presenting with chronic depressive episodes and a pervasive sense of "unreality." Despite professional success, he describes his life as "a series of disconnected tasks" without an overarching purpose, reporting a constant, low-level anxiety that prevents him from feeling any genuine satisfaction (Elation) or deep connection to his family.

Phase 1: Temporal Mapping and Resonance Analysis (Diagnostics)

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What constitutes the "self" that engages in this temporal integration? Gallagher's 4E cognitive model (embodied, embedded, enacted, extended) posits that the self is not a static entity but a processual, emergent pattern (Gallagher, 2013). The extension to the 4E+E model recognizes emotion as a constitutive regulatory force, where the control dynamics of the self-pattern are maintained by the affectively charged E-I balance (Tucker, Luu & Friston, 2025) .

We propose that the spiritual self-pattern acts as the vital bridge between the immediate, pre-reflective presence of the body and the vast horizons of existential meaning. While the minimal and ecological self-aspects operate primarily on rapid timescales to facilitate immediate action, the spiritual pattern allows the self to transcend the "tyranny of the now" . By recruiting the brain's slowest INTs, it enables a form of "temporal expansion," embedding the embodied experience of the present into a teleological and historical context (Northoff, 2023). Within this framework, spirituality is not an abstract belief but a structural mode of organization: it is the dynamic effort to maintain global coherence across all self-aspects. Consequently, a "crisis of meaning" is redefined as a structural fragmentation—a state where the self-pattern loses its temporal depth, resulting in a felt sense of alienation from one's own bodily experience (Gallagher, 2005).

Phase 2: Perturbation and Re-Weighting (Change)

This is the core phase of transformation. The goal is to dislodge the system from its maladaptive attractor—whether it be the quicksand of depression or the fortress of fanaticism—and move it toward the edge of criticality where reorganization becomes possible.

The Therapeutic Relationship as an External Anchor: Change requires the courage to face uncertainty (increased free energy). For a client like Mr. K, whose internal long-term priors have collapsed, the therapist must temporarily become the long-term prior. The therapeutic relationship functions as a "safe boundary condition" (Haken, 1991) or an externalized prefrontal cortex. By offering reliability and holding, the therapist artificially extends the client's INTs, allowing them to tolerate the chaos of change without disintegrating.

The Therapist's Self-Regulation: To serve as this anchor, the therapist must possess the metacognitive competence to regulate their own E-I balance. They must detect their own reactive tendencies—impatience (E-dominance) or excessive worry (I-dominance)—to remain a stable, resonant counterpart.

Interventions as Precision Modulation:

1. For the "Fragmented" (I-Dominance / Mr. K): The goal is Resource Activation to strengthen the E-system. We must build *new priors*. This involves behavioral activation and imaginative exercises not just to "feel better," but to generate positive evidence that refutes the pessimistic predictive model.
    - *Mr. K's Intervention:* A behavioral experiment was designed not just to test reality, but to extend his temporal horizon. By successfully engaging in a small, value-driven action, he generated a packet of sensory evidence that contradicted his "failure" prior. This successful error reduction strengthened his predictive confidence (E), effectively "lengthening" his functional INTs.
2. For the "Rigid" (E-Dominance / Frozen Priors): The goal is Reality Testing to strengthen the I-system. We must destabilize the frozen prior. This involves gentle Socratic questioning and mindfulness exercises designed to increase the precision of sensory evidence (bottom-up), forcing the rigid top-down model to acknowledge discrepancy.

Phase 3: Consolidation and Bayesian Binding (Integration)

After the old attractor has been destabilized, a self-organizing process of reorganization begins. The therapist's task is to help consolidate this new state into a stable, flexible regime of criticality.

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Core Tasks:

- Narrative Integration (Bayesian Binding): We co-construct a new meaning narrative. This is more than positive reframing; it is the creation of a complex, high-level model that can bind both the memory of past pain and the hope of future possibility into a coherent whole. For Mr. K, this meant a story where his sensitivity was not a defect, but a feature of his connectivity—a narrative that integrated his "I" (caution) and "E" (hope) into a metastable unity.
- Active Inference and Habituation: The new pattern must be inscribed into the body through action. Planning daily concrete actions serves to continuously confirm the new priors, creating a positive feedback loop that is consolidated during sleep (Tucker et al., 2025).
- Ritual as Temporal Scaffold: We establish practices (meditation, nature immersion, prayer) not as "tools" but as daily regulators of the E-I balance. These rituals serve as temporal anchors that artificially slow down the system's INTs, allowing the client to access the "spiritual self-pattern" independently. A gratitude practice trains the E-system to detect abundance; mindfulness trains the I-system to detect reality without judgment. Together, they maintain the capacity for resonance.

Conclusions

The integration of the spiritual self-pattern into the Resonance-Inference Model (RIM) builds a necessary bridge between the mechanics of the brain and the phenomenology of the spirit. It demonstrates that the human search for meaning is not an elective cultural luxury but a neurocognitive imperative. By situating this process within the hierarchy of Intrinsic Neural Timescales, we translate Viktor Frankl's "will to meaning" into a biological necessity: the requirement to bind sensory chaos through long-term temporal integration to preserve the unity of the self.

This framework moves psychotherapy beyond mere symptom management or narrative restructuring. It reconceptualizes the therapeutic encounter as a process of criticality management, where the therapist serves as an external regulator helping the client's system emerge from rigid or chaotic attractors. As we acknowledge the spiritual self-pattern as the supreme regulator of E-I criticality, we pave the way for a truly integrative, neuroscientifically informed practice—one that honors the whole person in their existential depth and supports their fundamental capacity for resilient self-organization.

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