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Defensive-Timing Disorders: A Neuroevolutionary Model of the Bipolar-Psychotic Spectrum

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Research Article

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Abstract

Mammalian social life oscillates between two broad modes: an agonic mode organised around dominance, tension, and defensive collapse, and a hedonic mode characterised by low arousal, reciprocity, and prestige-based coordination. Archaeological and anthropological evidence suggests that some Upper Palaeolithic groups moved fluidly between these modes, with ritual specialists (shamans) occupying a sanctioned niche in which brief psychotic-like states – often hallucinogen-facilitated – were tolerated and even valued. From a cognitive-neuroscience perspective, these altered states can be understood as transient perturbations of the timing architecture that normally aligns perception, simulation, and contextual inference. I propose that the bipolar-psychotic spectrum reflects a unified class of Defensive-Timing Disorders (DTD), arising from graded losses of parvalbumin-mediated inhibitory precision and hippocampal temporal-context stability. As this coupled scaffold weakens, defensive responses distort, salience becomes disordered, counterfactual representations gain excessive weight, and at the extreme, reverted escape emerges: a high-arousal immobility state representing a distinct pathophysiology. The same timing vulnerability may underlie the persistent cognitive impairments of schizophrenia, which can be viewed adds the cognitive expression of the same PV-hippocampal timing collapse. This paper integrates evolutionary anthropology, ethology, and cognitive neurodynamics to articulate a mechanistic account of the bipolar-psychotic spectrum that has not previously been formulated.

Introduction

Agonic social structures have shaped human minds for far longer than hedonic ones. For most of the Pleistocene, humans lived under dominance hierarchies in which power flowed from above, vigilance looked upward, and behavioural inhibition was the price of survival. In such systems, conflict detection and threat monitoring were not optional – they were the organising principles of social life – and under these conditions, escape is inhibited, agency is curtailed, and the behavioural inhibition system (BIS) – central to this thesis – becomes chronically engaged.

Michael Chance's (Chance, 1988) *Social Fabrics of the Mind* offered a compelling account of this architecture, describing how agonic societies enforce submission through "inhibited escape" (referred to here as *reverted escape*, after Stevens and Price (Stevens & Price, 2000)), to emphasise a collapse toward agonism – a defensive configuration in which the impulse to flee is blocked, producing high-arousal immobility and appeasement.

Yet the human story is not solely agonic. Something remarkable occurred in the Upper Palaeolithic – humans became self-domesticated (Benítez-Burraco et al., 2020). Aggressive conspecifics were excluded, craniofacial gracilisation emerged, and societies began to organise around prestige rather than dominance. Chance termed this the hedonic mode – a shift toward low-arousal, reciprocal, play-based sociality. This architecture did not erase the agonic architecture; rather, it created a dynamic tension between two modes of being, each with its own vulnerabilities.

This paper situates the bipolar-psychotic spectrum within this evolutionary landscape. I argue that these overlapping conditions arise from distortions in the brain's defensive-timing system – a coupled architecture in which parvalbumin interneurons provide inhibitory precision and the hippocampus supplies temporal context (Buzsáki & Wang, 2012). When this system is stable, perception, affect, and belief remain coherent. As timing precision degrades, defensive responses become distorted, salience becomes disordered, and counterfactual representations intrude (Friston, 2005). At the extreme, timing collapse produces reverted escape and the cognitive fragmentation characteristic of schizophrenia.

The Defensive-Timing Disorders (DTD) framework presented here integrates ethology, neurobiology, and evolutionary anthropology to offer a unified account of the bipolar-psychotic spectrum. It also provides a bridge between ancestral ritual specialists – whose socially sanctioned altered states may have been adaptive – and modern presentations of schizoaffective disorder (see also (Polimeni, 2022) for schizophrenia) in which mood disturbance and psychosis are a feature. This manuscript is written from the perspective of a psychiatrist with lived experience of mood disorder and psychosis, drawing together personal, clinical, and evolutionary insights into a single explanatory arc.

The Defensive-Timing Architecture

Across mammalian species, defensive behaviour depends on the precise coordination of two timing systems: fast inhibitory control provided by parvalbumin (PV) interneurons, and temporal-context sequencing supported by the hippocampus. Together, these systems stabilise perception, regulate salience, and align internal simulations with external reality. When this scaffold is intact, sensory evidence is precise, contextual inference is reliable, and counterfactual representations remain tethered to the present (Buzsáki, 2010).

The Defensive-Timing Disorders (DTD) framework proposes that the bipolar-psychotic spectrum reflects graded failures of this timing architecture. As PV-mediated precision weakens, sensory prediction errors become noisy, and hippocampal simulations intrude into consciousness; temporal coherence deteriorates, contextual boundaries blur, counterfactuals gain excessive weight, and the system becomes increasingly vulnerable to salience distortion (Friston et al., 2016). These timing failures do not produce discrete disease entities; rather, they generate a continuum of fallback attractors shaped by the interaction between environmental load and the specific point of failure within the defensive-timing system (Kapur, 2003).

A Unified Timing Spectrum

In this model, the major affective and psychotic presentations represent serial perturbations of a single dynamical structure. When PV networks maintain inhibitory precision and the hippocampus provides stable temporal context, the system remains in a hedonic, prestige-based mode of social engagement. As timing precision degrades, defensive responses shift toward agonic configurations: vigilance

increases, escape impulses become constrained, and the BIS begins to dominate behavioural organisation.

Further instability produces mixed affective-psychotic states, in which salience becomes disordered and counterfactual representations intrude into perception. At the extreme, collapse of PV-mediated precision and hippocampal temporal coherence generates internally driven percepts, threat-weighted priors (Friston et al., 2016), and reverted-escape dynamics. Schizophrenia represents the deepest point on this spectrum: a state in which context load overwhelms hippocampal prediction (Tsuji & Friston, 2023), locking the system into a rigid salience/threat attractor.

Reverted Escape: a Distinct Attractor

Within this architecture, reverted escape occupies a unique position. It is not a variant of depression, anxiety or PTSD, but a distinct defensive attractor that emerges when a fully mobilised flight impulse is abruptly constrained. Under these conditions, the fight-flight-freeze system (FFFS) becomes maximally conflicted, the behavioural inhibition system (BIS) exerts overwhelming inhibitory pressure, and the periaqueductal grey (PAG) generates a dual sympathetic-parasympathetic braking response (Vianna & Brandão, 2003). The result is *high-arousal immobility* – a state of vigilant stillness in which escape is impossible, agency collapses, and hippocampal timing becomes unstable. Reverted escape is the generic defensive-timing failure that generates acute psychosis, regardless of whether the diagnostic label is schizophrenia, bipolar I, or schizoaffective disorder.

This configuration provides a mechanistic bridge between ethological defensive strategies and human psychopathology, acted on by millennia of stigma. It explains why individuals in acute psychosis often display ambivalent approach-withdrawal behaviour, why catatonia resembles “scared stiff” immobility (Moskowitz, 2004), and why paranoid states frequently emerge from contexts of blocked escape. Reverted escape is thus both an ethological phenomenon and a neurocomputational failure mode – a timing collapse expressed through human interpretive systems.

This configuration has deep ethological roots, but in humans it becomes representationally elaborated. Across species, arrested flight, tonic immobility, and involuntary subordinate strategies (Price et al., 2007) arise when escape is blocked by a dominant adversary (Fanselow & Lester, 1988). In predisposed humans, the same defensive architecture is experienced as being trapped, scrutinised, or hunted – feelings that readily elaborate into paranoid interpretations. The system shifts into a mode of hypervigilant threat-expectancy, intrusive internally generated scenarios, loss of temporal coherence, and a compelling sense of imminent but unlocatable danger (Freeman et al., 2008). Cognitively, experience becomes dominated by urgent, self-referential meanings; affectively, by dread, agitation, and a drive to pre-empt threat; and phenomenologically, by a narrowing of the experiential field in which imagined possibilities acquire the force of impending realities (Kapur, 2003). In animal studies – which are notionally extended to humans – conflict and arousal leads to hippocampal timing destabilisation and generates threat-laden simulations that the BIS cannot resolve (McNaughton & Corr, 2004). These

simulations become the raw material from which persecutory beliefs are formed (Tsuji & Friston, 2023). Catatonia – often an elaboration of acute paranoid psychosis – represents the motoric extreme of this state: sympathetic arousal with profound inhibition of movement.

Reverted escape can therefore be viewed as a plausible mechanistic bridge between ethology and psychopathology. It helps account for the recurrent phenomenology of feeling trapped, scrutinised, or pursued; for the coexistence of escape urges and paralysis; and for the emergence of paranoid interpretations in situations of blocked flight. While it was relevant to me on two occasions, its claims require further investigation.

The Defensive-Timing Disorders Spectrum

The Defensive-Timing Disorders (DTD) spectrum (Table 1) conceptualises the extended bipolar-psychotic continuum as a graded breakdown of the brain's defensive-timing architecture. Each node reflects a characteristic interaction between environmental load and a specific failure point within the PV-hippocampal scaffold, producing a predictable fallback attractor – or, in the case of reverted escape, a non-fallback collapse. Each node is conceived as lying proximal to Nesse's (Nesse, 2004) cliff edge, cliff ridge or cliff face, where an otherwise advantageous trait may be pushed toward a high-performance optimum, beyond which even small increases see a sharp drop into pathological outcomes.

The spectrum begins with individuals who operate near the evolutionary "cliff edge" without system failure and ends with the timing collapse characteristic of schizophrenia. Between these poles lie a series of transitional states shaped by the interplay of behavioural inhibition (BIS), behavioural activation (BAS), the fight-flight-freeze system (FFFS), and dominance-related RAGE circuitry. Table 1 summarises these nodes, which I narrate below in a streamlined form.

<<Insert Table 1 **here>>**

Table 1

The spectrum of illness according to the coherence of each defensive-timing disorder (DTD) from the upper palaeolithic leaders(0) onward to schizophreniform illness (7) with the gradient due to graded breakdown of PV-hippocampal timing. See Supplementary Table 1 for clarification of the synthetic/empirical basis

DTD Node	Load	Failing System	Fallback Attractor
0: PRESTIGE LEADERS	cliff edge	N/A	N/A
1: RITUAL SPECIALISTS (SHAMAN)	Ambiguity load (cliff edge)	BIS divergence	Voluntary ritual-scaffolded, hallucinogen-mediated salience loosening (predisposed by family history of brief psychosis)
2: BIPOLAR PHENOTYPE (FASSAD)	Uncertainty Load (+/- cliff edge)	BIS threat prediction	Conservation (atypical-depression)
3: PSEUDOUNIPOLAR TM	Failure of control	BAS energy	Conservation (typus melancholicus depression)
4: BIPOLAR II	Rhythmic instability (energy-inhibition)	BAS → PV	Conservation with PV-mediated escape
5: SCHIZOAFFECTIVE	Integration load (inhibition-prediction)	PV + BIS (wobble)	Unstable mixed attractor (salience, escape, conservation).
6a: BIPOLAR I MANIA	Arousal load	Parvalbumin (PV) inhibition	Escape (mania) and Bipolar II-like depression
6b: REVERTED ESCAPE	Timing load	PV collapse Hippocampal	Escape attractor involuntary failing internally (not a fallback)
7: SCHIZOPHRENIA	Context load	Hippocampal prediction	Salience/Threat attractor

Node 0 – Prestige Leaders

Prestige leaders represent the optimal functioning of the defensive-timing system. They operate at the cliff edge – highly sensitive to social nuance, ambiguity, and group dynamics – yet maintain coherence because PV-mediated precision and hippocampal temporal context remain intact. Their influence derives from social valuation rather than dominance, and their timing architecture supports flexible, hedonic engagement.

Node 1 – Ritual Specialists (Shamanic Phenotype)

Ritual specialists carry an *ambiguity* load that pushes the BIS toward divergence. Their role historically involved navigating altered states – often hallucinogen-mediated – within a socially sanctioned scaffold. These brief excursions into salience loosening were adaptive in ancestral contexts, but they reveal a predisposition toward timing instability. Here, the system remains coherent but operates closer to the threshold at which simulations intrude into perception. They represent the ancestors of modern day schizoaffective disorder, acted on by stigma.

Node 2 – Bipolar FASSAD Phenotype

The FASSAD phenotype – characterised by fear, anxiety, self-esteem instability, striving for excessive goals, addiction, and depression (as sourced in the literature) – emerges when *uncertainty* load overwhelms BIS threat prediction. PV precision remains mostly intact, but the system begins to oscillate between approach and withdrawal – the pursuit of prestige and grief at its loss. The fallback attractor is conservation – an atypical depressive state marked by inhibited escape and reduced energetic drive.

Node 3 – Pseudounipolar Melancholia

When control fails and the burden of obsessional duty becomes unsustainable, predisposed individuals may enter a melancholic depression resembling Tellenbach (Tellenbach, 1961)'s typus melancholicus—a group that, in his original work, included both unipolar and manic-depressive presentations. In my simulations this phenotype emerged spontaneously from the shamanic lineage, and clinically I recognise elements of both this and the FASSAD profile, especially during prodromal worsening. Akiskal (Akiskal, 1999) later termed this pattern 'pseudounipolar' to highlight its unipolar appearance despite bipolar-spectrum family loading and associated features. This node reflects a deeper conservation attractor: a rigid, energy-collapsed state in which PV-based timing is strained but not yet destabilised.

Node 4 – Bipolar II Disorder

Here rhythmic instability arises between BAS-driven energy conservation and PV-mediated escape (hypomania). The system oscillates between these attractors because PV inhibitory precision is intermittently weakened, allowing counterfactual 'as-if' representations to intrude without dominating or forming delusions. Prestige dynamics tilt this architecture, biasing the system toward either approach-coloured hypomania or conservation-driven depression

Node 5 – Schizoaffective Disorder

Integration load destabilises both PV and BIS systems, producing an unstable mixed attractor that spans salience distortion (psychosis), escape impulses (hypomania), and conservation (depression). This level forms the evolutionary "ridge": a genetically pluripotent zone where mood instability and schizotypal divergence coexist. The system wobbles between hedonic and agonic modes, making it uniquely

vulnerable to bifurcation into psychotic and affective states. It shows only partial or intermittent disturbance of self-experience, in contrast to deeper and more pervasive form-level alterations characteristic of schizophrenia (Pienkos, 2024).

Node 6a – Bipolar I Mania

Arousal load overwhelms PV inhibition, producing a pure escape attractor. High-gain simulations, inflated priors, and disinhibited behaviour reflect a system in which inhibitory timing can no longer constrain hippocampal output. Mania is thus conceptualised as a PV-driven escape state, oriented towards dominance, with depressive phases emerging only when the system oscillates into a bipolar II-like conservation fallback.

Node 6b – Reverted Escape (Non-Fallback Collapse)

Located between mania and schizophrenia, reverted escape is distinct from all other levels. The Timing load collapses PV and hippocampal coordination simultaneously, generating an involuntary, internally *failing escape attractor*. This is not a fallback but a breakdown: a high-arousal immobility state in which the impulse to flee is blocked, the BIS exerts maximal inhibitory pressure, and hippocampal timing becomes unstable. It is the ethological core from which acute paranoid elaborations and catatonic profiles can emerge.

Node 7 – Schizophrenia

At the deepest point of the spectrum, reverted escape drives *context load* beyond hippocampal predictive capacity, causing temporal coherence to collapse. Internally generated simulations dominate perception, locking the system into a salience-threat attractor and producing profound ipseity disturbance. This level, when the disturbance is severe and persistent, reflects the cognitive expression of PV-hippocampal timing failure: impaired working memory, disorganised thought, slowed processing, poor learning, and reduced metacognition. The same collapse of generativity, reward prediction, and expressive timing underlies the persistent negative symptoms of alogia, avolition, anhedonia, and affective flattening.

A Spectrum of Timing Failure

Across the DTD spectrum, the same architecture fails in progressively deeper ways. Prestige leaders operate at the cliff edge without collapse; ritual specialists (shamans) hover near the threshold; bipolar phenotypes reflect early timing instability; schizoaffective states represent unstable integration; mania reflects PV inhibition failure; reverted escape (triggering acute psychosis) marks timing collapse under blocked flight; and schizophrenia represents the deepest context-driven breakdown.

This unified framework reframes the bipolar-psychotic spectrum not as a set of discrete disorders but as a graded series of timing-based attractors shaped by evolutionary history and neurobiological dysfunction.

Dynamical Systems and the Architecture of Collapse

Dynamical systems theory provides a powerful lens for understanding how timing instability produces psychiatric attractors. Biological and psychological systems often behave nonlinearly: small parameter shifts can produce sudden qualitative changes in behaviour. When conflict, delay, and feedback loops interact, the system may fall into “strange attractors” – stable yet pathological patterns that resist perturbation.

Within this framework, the defensive-timing system can be visualised as a landscape of basins. Hedonic engagement occupies one basin; agonic vigilance another; mixed affective-psychotic states a third; and deep salience/threat attractors a fourth. Reverted escape emerges when the system becomes trapped in a high-arousal immobility basin: each attempted escape redirects the trajectory back into the same region, reinforcing the pattern.

This dynamical framing clarifies why individuals oscillate between states, why transitions can be abrupt, and why recovery often requires a bifurcation – a qualitative shift in system parameters rather than incremental change. It also explains why schizoaffective individuals, positioned on the evolutionary ridge, are uniquely vulnerable to falling into symbolic (psychotic) and affective (depressive or hypomanic) basins. In this model they do not become fully manic – a state confined to bipolar I disorder.

The Tesseract of Defensive Timing

<<insert Fig. 1 **here>>**

To capture the multidimensional nature of these dynamics, the Tesseract model situates defensive timing within a four-axis space defined by:
• Social withdrawal (FFFS)

• Social approach (BAS)

• Social divergence (BIS)

• *Social dominance (RAGE)*

These syndromal axes terminate in four clinical archetypes: melancholia, hypomania, schizophrenia, and mania.

The Tesseract naturally contains basins of attraction. Some are shallow and easily exited; others are deep and self-reinforcing. Reverted escape occupies a region defined by high BIS load and high FFFS withdrawal pressure – a zone where escape impulses are blocked, salience is amplified, and hippocampal timing becomes unstable. This region is the ethological core from which paranoid elaborations, catatonic profiles, and psychotic immobility can emerge.

By integrating ethology, neurobiology, and dynamical systems, much like Stevens and Price (Stevens & Price, 2000) have attempted in two dimensions, the Tesseract provides a conceptual map of how individuals move through the defensive-timing landscape. It also clarifies why certain trajectories – such

as the transition from mania to psychosis, or from schizotypy to schizophrenia – are more common than others. The architecture itself channels movement along predictable paths.

An Evolutionary Ridge: From Upper Palaeolithic Ritualists to Modern Psychopathology

The Defensive-Timing Disorders framework gains additional depth when viewed through an evolutionary lens. In the Upper Palaeolithic, ritual specialists occupied a socially sanctioned niche at the boundary between hedonic and agonic modes. Their roles required heightened sensitivity to ambiguity, salience, and social divergence – traits that today resemble schizotypy. These individuals operated near Nesse's (Nesse, 2004) "cliff edge": a region of high adaptive potential but increased vulnerability to timing collapse.

In small, cohesive groups, such traits may have been advantageous. Ritual specialists mediated conflict, interpreted symbolic material, and navigated altered states – often hallucinogen-facilitated – within a communal scaffold that buffered them from collapse. Their timing architecture, though fragile, was supported by social structure.

As human societies shifted toward stratification, urbanisation, and dominance hierarchies, the ecological niche that once stabilised these individuals eroded and stigma became apparent; the same timing sensitivity that once supported ritual expertise now predisposes individuals to affective instability, psychosis, and reverted escape. Schizoaffective disorder may represent the modern echo of this ancestral ridge.

This evolutionary ridge explains why the bipolar-psychotic spectrum is both ancient and persistent. It is not a collection of discrete diseases, but a continuum shaped by the interaction between neurobiological vulnerability and shifting ecological demands. The DTD framework also offers an evolutionary rationale for the persistence of bipolar and psychotic traits. What once supported ritual specialists now predisposes individuals to the cliff edges of affective instability, psychosis, and reverted escape. The DTD spectrum thus reflects both an evolutionary inheritance and a neurobiological vulnerability: a single timing system stretched across radically different temporal and ecological demands.

<<insert Fig. 2 **here>>**

An Autobiographical Interlude

Freed from the constraints of active illness – which visited me every decade or so in earlier life – I can now look back on the phenomenology of my first paranoid episode with a degree of clarity. It began in an airport, and airports have always been "thin places" for me.

In Celtic traditions, thin places are liminal zones where the boundary between worlds softens. Sacred groves, river crossings, windswept ridges - places where one is neither fully here nor there. Modern airports share this quality. Once we pass through security, we enter a suspended realm: between nations,

*between identities, between temporal anchors. Time dilates. Place becomes abstract. The self loosens (*Taylor, 2025*).*

For someone with a vulnerable defensive-timing system, this liminality can be destabilising. Airports are contemporary agoras, where ancestral clans meet transported outgroups. Languages shift. Physiognomies vary. Social cues become ambiguous. The appraisal system, already strained, begins scanning for outliers - for signs of divergence, dominance, or threat. Under reverted-escape conditions, the BIS tightens its grip, and the world becomes a field of potential adversaries.

In the Manila airport, I felt this acutely. I had been mildly manic, but the transition into agonic space was abrupt. People appeared flattened, as if cut from cardboard – perceptually present but stripped of depth. My salience network was overactive, searching for meaning in lights, sounds, and glances. Members of the opposite sex seemed unusually salient, perhaps reflecting an ancestral imperative for reproduction under threat. Everything felt slightly concealed, as though the world were holding its breath.

I was no longer in the hedonic shared world; I had crossed into an agonic attractor – reverted escape. My behavioural-inhibition system bent every ambiguity back toward threat, while reward, stress, and salience circuits were all destabilised, likely driven by disordered hippocampal output cascading into dopaminergic pathways. I was caught in a defensive-timing loop with no way out, and then the depression arrived on top of it.

Looking back, I can see how closely this state mirrored the ethological patterns described by Stevens and Price: (depressive) yielding after rank loss, tonic immobility under inescapable threat, and the “scared stiff” catatonic profile described by Moskowitz (Moskowitz, 2004). Yet reverted escape is not reducible to any of these. It is a distinct defensive mode – a high-arousal immobility state in which the impulse to flee collapses inward, generating a vortex of vigilance, paralysis, and symbolic threat.

In that moment, I was a degraded shaman of sorts – standing on Nesse’s cliff edge, prestige-starved, slipping into a basin of collapse. I did not understand it then. I fumble with answers now.

Conclusion

Why write publicly about a time of profound vulnerability – the descent into paranoid psychosis in a foreign airport – and do so through the lenses of sociology, ethology, and neuroscience? The answer is simple – time has passed, and with it the shame that once sealed these memories. A friend once told me, “What does it matter what people think?” I believe him.

My first psychosis was a dangerous, bewildering well of entrapment – a deep attractor. I searched for an exit. Months later, a ferry ride across the harbour – unmedicated – seemed to bump me back into the hedonic world, where I have remained for many years, albeit for brief excursions into the disorder. The oscillation between these worlds shaped my life, my clinical work, and ultimately this manuscript.

The Defensive-Timing Disorders framework is my attempt to make meaning of that oscillation. It integrates evolutionary anthropology, ethology, neurobiology, and lived experience into a single explanatory arc. It reframes the bipolar-psychotic spectrum not as a collection of discrete diseases but as a graded breakdown of common root timing architecture that once supported ritual specialists and symbolic mediators. It situates psychosis within a continuum of defensive strategies, and it recognises reverted escape as a distinct attractor with deep evolutionary roots.

There is mystery in mental illness, but mystery need not preclude understanding. By articulating the timing architecture that underlies these states – and by acknowledging the personal terrain through which I have travelled – I hope to offer a framework that is both scientifically grounded and humanly recognisable. This is not merely an academic exercise. It is an act of integration – a way of bringing coherence to experiences that once felt incoherent – and of offering to others a map through landscapes I once navigated alone.

Declarations

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Author Contribution

Authors' contributions: JLB wrote and revised the manuscript.

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Figures

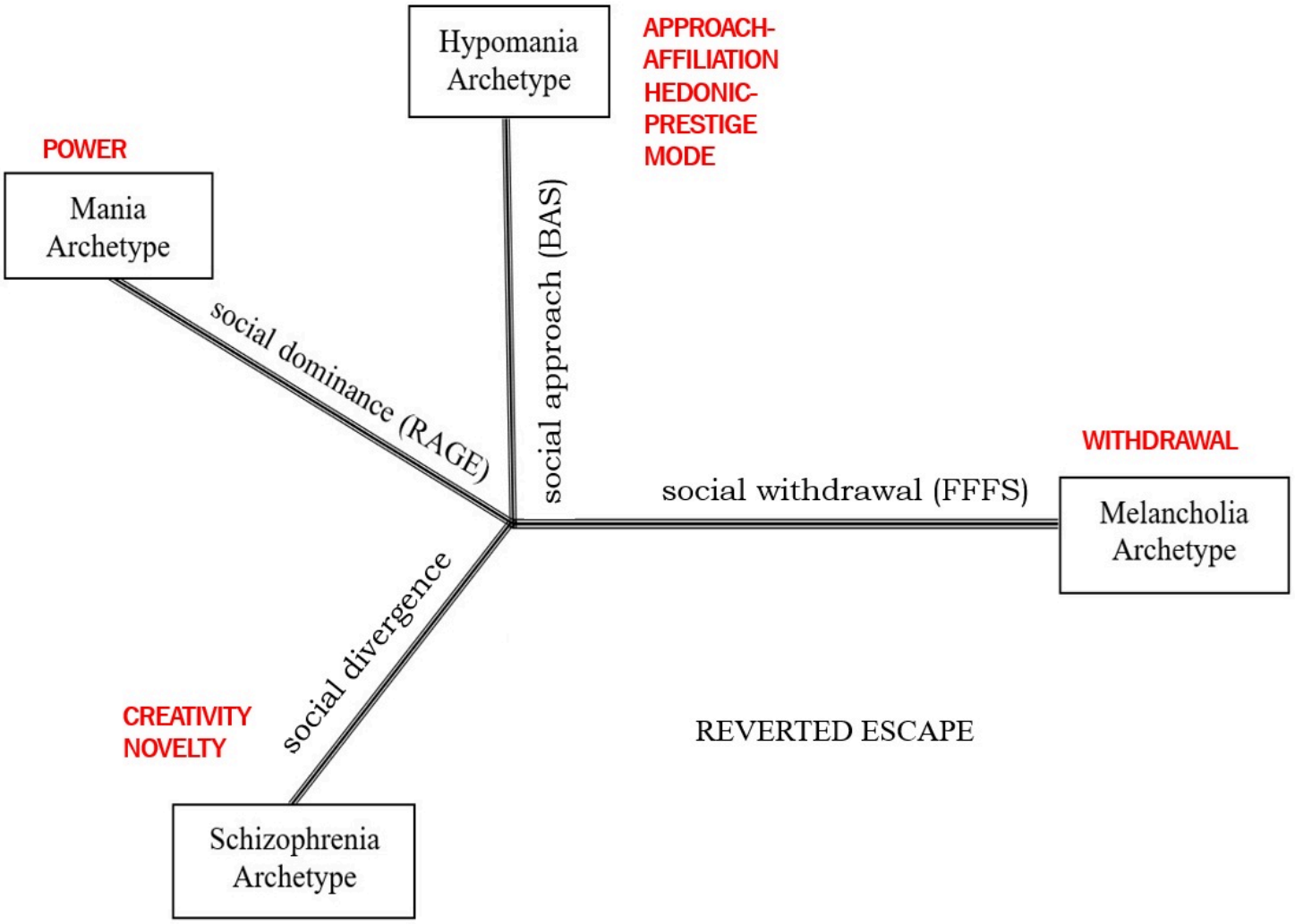


Figure 1

The four-dimensional Tesseract of defensive timing, defined by the axes of social withdrawal (FFFS), social approach (BAS), social divergence (BIS), and social dominance (RAGE). Reverted escape emerges at the intersection of high BIS load and high FFFS withdrawal pressure. This may be used to locate mental states and to simulate them over time

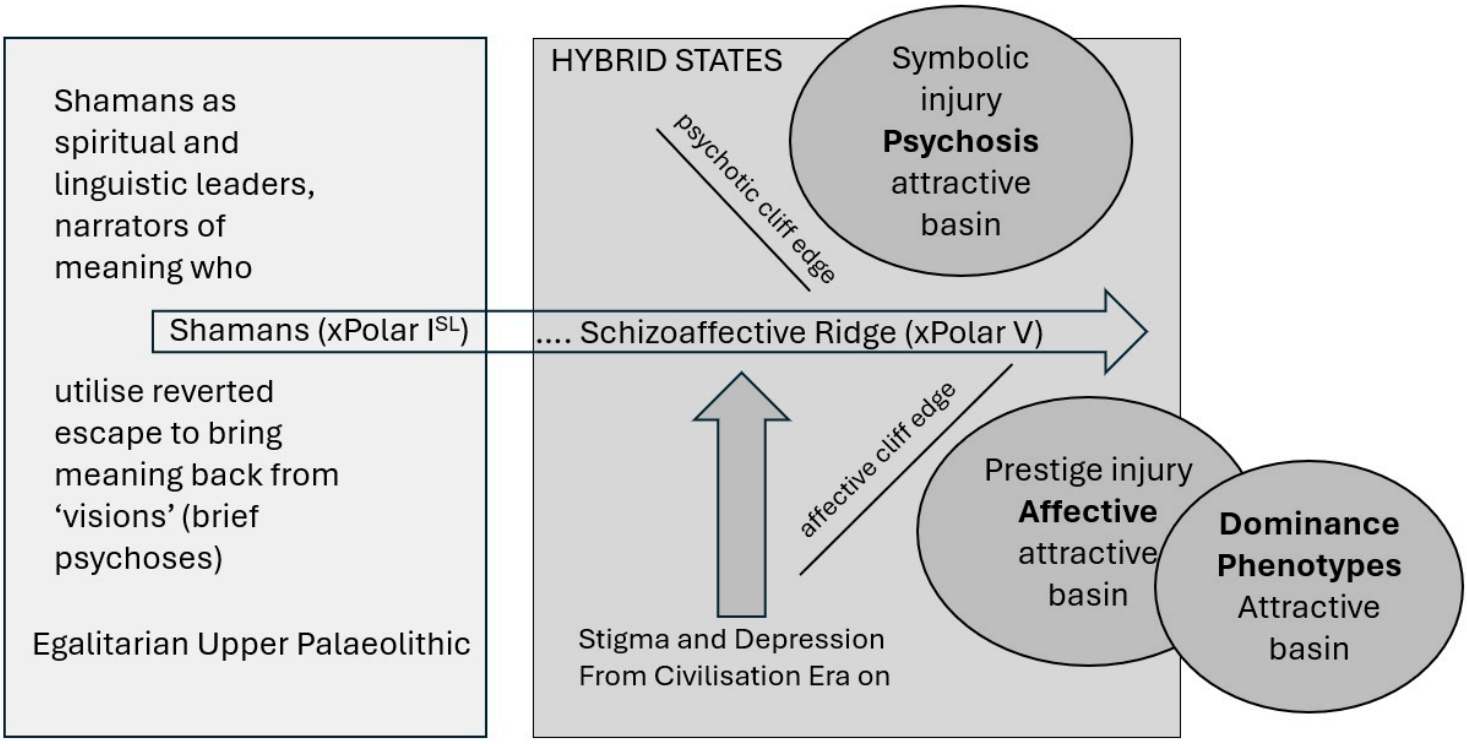


Figure 2

The evolutionary ridge from the Upper Palaeolithic to the Contemporary Era (to the right) – where stigma has worsened prognosis over millennia; This structure forms a ridge for schizoaffective disorder from which psychotic and affective cliff edges may arise, leading to schizophreniform, affective and dominance (mania) groupings

Supplementary Files

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