The Primordial Mind:

An Integrated Neuroevolutionary Ontology of Human Psychic Architecture

By

Pedro Ajala

Pedro H. B. Ajala

Psychoanalyst - Independent Researcher

Abstract

The Ontology of the Primordial Mind proposed in this work presents a hierarchical, neuroevolutionarily informed model designed to integrate findings from evolutionary psychology, social neuroscience, Paleolithic anthropology, stress epigenetics, philosophy of emotions, and cultural learning theory. In its current formulation, the model conceptualizes the Primordial Mind as a psychic architecture shaped over hundreds of thousands of years, articulating basal neurophysiological processes, socially relevant functional mechanisms, instinctive motivational modules, pre-reflective affective filters, and a symbolic-reflexive layer that, although evolutionarily recent, remains deeply modulated by ancestral substrates. The ontology is structured across six interdependent levels (0 to 5), unified by transversal mechanisms that provide system-wide plasticity, including interoception, cumulative cultural learning, active inference, HPA-axis regulation, and environmentally responsive epigenetic processes.

Level 0 corresponds to the pre-tribal ecological and social context, characterized by small-scale bands, high interdependence, environmental vulnerability, and elementary forms of care, vigilance, and aggression regulation. Archaeological and ethnographic evidence suggests that these conditions served as the ecological backdrop against which early human social tendencies were calibrated. Level 1 represents the primordial neurophysiological infrastructure—threat detection systems, salience networks, interoceptive circuits, and affiliative neural pathways—providing the parameters that guide attention allocation and internal state regulation.

Level 2 encompasses the functional mechanisms that operate upon this infrastructure, such as vigilance, bonding, status evaluation, reciprocity, fast social reading, and coalition propensity. Level 3 comprises the instinctive motivational modules—care, defensive and offensive aggression, mate-seeking, group protection, and exploration—conceptualized not as rigid instincts but as flexible motivational heuristics shaped by bodily states, social context, and learning history. Level 4, the primordial affective triage, represents the convergence point between body and environment, synthesizing interoceptive signals, implicit memories, anticipations, and social cues into rapid emotional priorities that precede reflective cognition. Level 5, the modern reflexive mind, emerges upon this platform, producing autobiographical narrative, symbolism, normative morality, long-term planning, and identity—crucially without replacing earlier layers but reinterpreting and modulating them.

The model is unified by transversal mechanisms that regulate developmental and intergenerational calibration: interoception as the body–brain axis governing emotional valence; cumulative cultural learning as an amplifier of ancestrally shaped competencies; epigenetic processes shaped by early care as modulators of physiological reactivity and social sensitivity; and active inference as the computational framework guiding uncertainty minimization in social environments.

As a conceptual framework, the proposed ontology integrates archaeological, neurobiological, behavioral, cultural, and philosophical evidence into a coherent model of the human psyche. It generates testable predictions—for example, that interoceptive interventions alter rapid social choices; that synchronized rituals reduce social uncertainty and increase cooperation; that early caregiving history shapes threat sensitivity through epigenetic pathways; and that cultural prestige dynamics reorganize the expression of ancestral motivational modules within a few generations. The model also reframes contemporary psychological suffering as a product of misalignments between ancestral parameters and modern environments.

Ultimately, the Ontology of the Primordial Mind does not present itself as a final answer but as an integrative heuristic intended to guide future research in social neuroscience, developmental psychology, evolutionary anthropology, behavioral epigenetics, and philosophy of mind. Its strength lies not in offering definitive conclusions but in its capacity to unify dispersed evidence, propose plausible mechanisms, and generate productive research programs that bridge biology, culture, and subjectivity into a coherent account of the human psyche.

INTRODUCTION

1. Introduction

This introduction presents the concept of the **Primordial Mind** as an integrated **neuroevolutionary ontology of human psychic architecture**. Its aim is to address theoretical gaps by articulating findings from evolutionary psychology, Paleolithic anthropology, affective neuroscience, transgenerational epigenetics, cultural learning theory, and the philosophy of mind and emotions.

The **Primordial Mind** is defined as a set of neurocognitive and socioemotional processes shaped over hundreds of thousands of years, primarily within pre-tribal contexts and the earliest tribal formations. It operates as an evolutionarily calibrated psychic infrastructure responsible for organizing perception, emotion, bonding, threat assessment, status sensitivity, aggressivity, reciprocity, and early forms of prospective imagination, all prior to the emergence of fully reflective cognition.

The central hypothesis asserts that this structuring psychic layer organizes affective and social elements at a pre-conscious level, functioning as a hybrid system composed of ancestral neurobiological predispositions, hunter-gatherer patterns of sociality, and cumulative cultural learning.

The interdisciplinary foundation of this article includes contributions from:

Evolutionary Psychology: Models of specialized cognitive modules (Cosmides & Tooby, 1992; Buss, 2019), while emphasizing that such models often neglect the emergence of these functions from pre-reflective affective systems.

Affective Neuroscience: Panksepp's primary emotional systems (1998, 2012) and LeDoux's neurobiology of defense (2015), alongside models of active inference and interoceptive regulation (Friston, 2010; Barrett, 2017), which highlight ancestral "affective scaffolding."

Transgenerational Epigenetics: Research by Weaver et al. (2004), Yehuda (2014, 2016), Szyf (2009), and Champagne (2010) demonstrating how caregiving, stress, and social organization modulate emotional regulation and environmental reactivity, although empirical human data remain limited.

Paleolithic Anthropology: Evidence from Wrangham (2019), Hrdy (2009), Tomasello (2019), and Sterelny (2012) concerning cooperation, alloparental care, task division, and coalitional aggression.

Cultural Learning: Henrich's (2016) model of cumulative cultural evolution and related authors, describing mechanisms of social transmission, conformity, and normativity.

Taken together, this introduction establishes the **Primordial Mind** as a framework capable of integrating dispersed findings and offering a more comprehensive understanding of human psychic architecture.

Over recent decades, advances in evolutionary psychology, anthropology, social neuroscience, and developmental biology have demonstrated that the human psyche emerges from the interaction between neurobiological predispositions, cumulative cultural learning, and selective pressures shaped within prehistoric social ecologies. Nevertheless, a central gap remains: the absence of an integrative model describing the intermediate psychic layer that connects inherited biological mechanisms to higher-order symbolic cognition and cultural dynamics.

To address this gap, the article proposes a **hierarchical ontology of the Primordial Mind**. This ontology refers to an integrated layer of neurocognitive and socioemotional processes shaped over extended evolutionary periods, responsible for organizing social perception, threat evaluation, affective regulation, bonding, status sensitivity, patterns of aggressivity, reciprocity, and pre-reflective imagination. It constitutes an intermediate level of psychological architecture: not reducible to instincts, not equivalent to modern symbolic cognition, and not identical to cultural content, but rather the functional ground that renders all these domains possible.

The article is structured as follows:

- First, it presents the pre-tribal context that shaped the Primordial Mind system;
- Next, it describes the hierarchical ontology and its levels;
- Subsequently, it reviews anthropological, neurobiological, and epigenetic evidence;
- Finally, it discusses implications for human behavior, cooperation, conflict, cultural learning, and primary psychodynamics.

1.1. Theoretical Gap

The central theoretical gap lies in the absence of an integrative model capable of articulating evolutionary psychology, Paleolithic anthropology, affective neuroscience, transgenerational epigenetics, and cultural learning theory into a coherent ontology of human psychic architecture. Current research programs tend to operate in isolation, describing specific aspects of behavior or cognition without providing a structural framework that explains how ancestral neurobiological mechanisms, pre-tribal ecological pressures, and cumulative sociocultural dynamics converge to shape the mind.

The limitations of existing approaches can be summarized as follows:

- **Evolutionary Psychology.**

While it describes specialized cognitive modules and functional adaptations (Cosmides & Tooby, 1992; Buss, 2019), it tends to operate at an abstract computational level, devoting limited attention to subcortical affective dynamics and interoceptive systems that modulate the expression of these modules. Contemporary critiques (Buller, 2006) emphasize the lack of a model explaining the transition between instinctive mechanisms and symbolic cognition.

- **Paleolithic Anthropology.**

It reconstructs hominin ecologies, niches, and forms of social organization (Wrangham, 2019; Hrdy, 2009; Tomasello, 2019; Sterelny, 2012), but rarely explicates how such conditions shaped the evolution of internal psychic structure.

- **Affective Neuroscience.**

It delineates systems of defense, seeking, attachment, motivation, and social interaction. However, even when integrated with models of active inference and interoceptive regulation (Friston, 2010; Barrett, 2017), it remains largely focused on the brain's proximal machinery, offering limited articulation between ecological variation, affective plasticity, and patterns of sociality.

- **Transgenerational Epigenetics.**

It demonstrates that experiences of caregiving, stress, and social organization leave enduring marks on emotional regulation and environmental reactivity (Weaver et al., 2004; Yehuda, 2014), yet lacks an evolutionary framework that situates these transmissions along the continuum from archaic hominins through hunter-gatherer societies to complex cultural formations.

- **Cultural Learning Theory.**

Cumulative cultural evolution (Henrich, 2016) explains mechanisms of transmission, conformity, and normativity, but often operates at the intergroup level, with less clarity regarding the neuroevolutionary constraints that enabled the emergence of these processes.

- **Contemporary Philosophical Approaches.**

They recognize that affects, norms, and symbolic structures profoundly shape human behavior, yet generally lack a systematic neuroevolutionary grounding, leaving a gap between affective phenomenology, biological organization, and cultural historicity.

In summary, the theoretical gap consists in the absence of an integrative framework capable of uniting nature (neuroevolutionary architecture), history (long-term environmental and social pressures), and culture (learning, symbolization, and normativity) within a unified explanation of the psyche.

The theory of the **Primordial Mind** aims to fill this gap. By integrating pre-tribal ecological pressures, affective neurophysiological mechanisms, instinctive systems, and processes of cultural transmission, it advances a hierarchical neuroevolutionary model capable of explaining how perceptual, affective, and symbolic dispositions emerged, were calibrated, and became consolidated over hundreds of thousands of years.

1.2. Theoretical–Scientific Problem

The central theoretical–scientific problem concerns the absence of an integrative model capable of explaining the full articulation between neuroevolutionary mechanisms, ancestral ecological pressures, pre-tribal social dynamics, and later symbolic processes in the formation of the human mind. This absence has resulted in a fragmented field, in which different disciplines generate partial explanations that fail to converge into a general theory of psychic architecture.

What is lacking is a unified conceptual structure capable of integrating ancestral affective–instinctive systems, neurobiological development, pre-tribal evolutionary pressures, epigenetic plasticity, and cumulative sociocultural mechanisms, understanding the human mind as a stratified layer of systems in continuous interaction.

The core limitations can be synthesized along the following axes:

- **Disciplinary Fragmentation.**

Despite significant advances in evolutionary psychology, Paleolithic anthropology, affective neuroscience, transgenerational epigenetics, cultural learning theory, and the philosophy of emotions, none of these fields, in isolation, produces a comprehensive model of human psychic architecture.

- **Evolutionary Psychology and the Transition to the Symbolic.**

Models such as the “modular mind” proposed by Cosmides and Tooby (1992) and Buss’s approach (2019) describe adaptive functional units but fail to explain how these functions emerge from pre-reflective affective systems or ancestral neurophysiological infrastructures. Critiques such as those advanced by Buller (2006) highlight the absence of a model that explicates the transition from instinctive mechanisms to symbolic cognition.

- **Paleolithic Anthropology and Internal Psychic Organization.**

Authors such as Wrangham (2019), Hrdy (2009), Tomasello (2019), and Sterelny (2012) demonstrate how cooperation, alloparental care, task division, and coalitional aggression shaped hominin behavior. However, these studies rarely formulate a model explaining how such ecological and social pressures shaped internal psychic structure.

- **Affective Neuroscience and the Historical Dimension.**

Panksepp (1998, 2012) and LeDoux (2015) identified primary emotional systems and defense circuits. Nevertheless, even when articulated with models of active inference and interoceptive regulation (Friston, 2010; Barrett, 2017), affective neuroscience tends to focus on proximal mechanisms, without integrating these findings into the evolutionary history of the genus *Homo* or into later social and symbolic dynamics.

- **Transgenerational Epigenetics and the Accumulation of Selective Pressures.**

Research by Yehuda (2014, 2016), Szyf (2009), and Champagne (2010) demonstrates that experiences of stress, caregiving, and violence can modify methylation patterns and neuroendocrine axes. However, a theory is still lacking that situates these transmissions within a long-term evolutionary context, explaining how such marks accumulate, stabilize, or transform over thousands of years.

- **Cultural Learning Theory and the Non-Symbolic Layer.**

The work of Henrich (2016), Boyd and Richerson (1985, 2005), and Legare and Harris (2016) explains social transmission, normativity, and cooperation. Yet the non-symbolic psychic foundations that make conformity, reputation sensitivity, and norm compliance possible—central elements of the Primordial Mind—remain insufficiently described.

- **Philosophy of Emotions and Society without a Neuroevolutionary Basis.**

Nussbaum (2001), Damasio (2010), Sloterdijk (1998), Foucault (1975–1976), and Taylor (1985) analyze affective worlds, power dynamics, and the constitution of the self, but generally without a systematic neuroevolutionary grounding that connects these phenomena to ancestral psychic structures.

Synthesis of the Problem.

Despite substantial advances across the aforementioned disciplines, we still lack a model capable of fully explaining the integration of neuroevolutionary mechanisms, ancestral ecologies, pre-tribal social structures, and later symbolic processes.

The **Primordial Mind Theory** emerges precisely to address this gap by proposing a hierarchical neuroevolutionary model that integrates pre-tribal pressures, ancestral affective mechanisms, instinctive systems, and processes of cultural transmission, explaining how perceptual, affective, and symbolic predispositions were formed, calibrated, and crystallized over hundreds of thousands of years.

1.3. Objective of the Theoretical Proposal

The central objective of this proposal is to present the **Primordial Mind Theory**, an integrative model that describes human psychic architecture as a hierarchical, stratified, and neuroevolutionarily continuous system. The theory seeks to overcome existing fragmentations among evolutionary psychology, Paleolithic anthropology, affective neuroscience, transgenerational epigenetics, cultural learning theory, and the philosophy of mind by offering a framework that integrates these domains into a coherent structure.

Specific Objectives

1. Define the Primordial Mind
To characterize the **Primordial Mind** as a psychic infrastructure formed over hundreds of thousands of years, responsible for organizing social perception, affective bonding, defensive responses, status processing, aggressivity, cooperative mechanisms, and early forms of pre-symbolic imagination. This layer precedes modern reflective cognition, operating as a hybrid functional system resulting from the convergence of neurobiological predispositions, ancestral sociality, and cumulative cultural learning.

2. Establish a Hierarchical Ontology
To formalize the Primordial Mind as a system composed of six interdependent levels:

- **Level 0 – Ancestral Selective Platform (Pre-Tribal Context)**

Evolutionary ecology, micro-social structures, recurrent threat, cooperative caregiving, and early cultural transmission.

- **Level 1 – Primordial Infrastructure**

Evolutionarily calibrated neurophysiological predispositions: subcortical affective systems, neural social architecture, and sensitivities to bonding, threat, fairness, and status.

- **Level 2 – Primordial Mechanisms**

Adaptive socioecological functions (vigilance, relevance detection, bonding, reciprocity, status monitoring, defensive aggressivity, and affective imagination).

- **Level 3 – Primordial Modules**

Phylogenetic motivational patterns (defense, sexuality, parental care, coalition formation, prestige competition, exploration).

- **Level 4 – Pre-Reflective Filtering**

An affective–sensory–motor interface that translates emotional states into action tendencies and implicit narratives.

- **Level 5 – Modern Reflective Mind**

Symbolic cognition, complex language, cultural narrative, self-awareness, and executive control.

3. Integrate Disciplines and Lines of Evidence
To demonstrate how Paleolithic ecological pressures, structural emotional systems (Panksepp; LeDoux), intergenerational learning (Henrich; Boyd & Richerson), cumulative epigenetic marks (Yehuda; Champagne; Szyf), and social dynamics of cooperation and conflict (Wrangham; Hrdy; Tomasello; Sterelny) converge to shape a universal and functionally stable psychic repertoire.

4. Provide an Explanatory Framework with Testable Predictions
To construct a structure capable of generating hypotheses concerning:

- Transcultural patterns of aggressivity, altruism, and coalition formation;
- Shared cognitive biases;
- Universal psychodynamic vulnerabilities;
- Systematic cultural variations resulting from epigenetic calibration and early socialization.

5. Ground Future Applications
To establish theoretical foundations for:

- Clinical investigations of residual ancestral mechanisms in contemporary life;

- Anthropological analyses of modern symbolic tribalism;
- Philosophical studies of the entanglement between affect, narrative, and sociality;
- Neuroscientific research aimed at locating operational correlates of the proposed ontology.

1.4. Epistemological and Interdisciplinary Foundations

The **Primordial Mind Theory** is grounded in an explicitly interdisciplinary epistemological framework. It begins from the recognition that no single domain—biological, psychological, social, cultural, or philosophical—possesses sufficient explanatory scope to account for the complexity of the human psyche. Accordingly, it adopts the complementarity of levels of causation defined by Tinbergen (1963), integrating **proximal causes** (immediate neuropsychological mechanisms), **distal causes** (evolutionary history and selective pressures), **ontogenetic causes** (individual development, plasticity, and epigenetic marking), and **functional causes** (the adaptive value of emotional and social systems). The Primordial Mind is conceived as the convergence of these four dimensions, articulating neural predispositions, ancestral social patterns, and emerging symbolic processes.

1.4.1. Guiding Principles of Theoretical Construction

1. Multidimensional Coherence
Each hypothesis must maintain compatibility across neurobiological evidence, archaeological and ethnographic data, comparative studies with primates, cross-cultural research, and philosophical formulations concerning affect, agency, and subjectivity.

2. Empirical Triangulation
A mechanism is considered primordial only when it demonstrates:

- Parallels in primates and other social mammals;
- Documented presence in hunter-gatherer societies;
- Basic neuroaffective correlates;
- Intercultural stability and recurrence.

3. Theoretical Iterativity
The ontology is conceived as expandable: each layer and mechanism remains open to revision as new empirical evidence accumulates, particularly in neuroscience, epigenetics, and evolutionary anthropology.

1.4.2. Integrated Fields and Their Contributions

Evolutionary Psychology
Provides the framework for understanding how selective pressures shaped emotional and social predispositions. Central authors include Tooby and Cosmides, Buss, Barrett, and Kurzban.

Paleolithic Anthropology and Hunter-Gatherer Ethnography
Offers data on social organization, alloparental care, cooperation, coalitional aggression, task division, and territoriality patterns (Wrangham; Hrdy; Tomasello; Kelly; Sterelny).

Affective and Social Neuroscience
Describes the shared neural architecture underlying bonding, defense, status monitoring, moral evaluation, and social cognition (Panksepp, LeDoux, Barrett, Pessoa, Sapolsky).

Transgenerational Epigenetics
Clarifies mechanisms of stress sensitivity, affiliation, and threat responsiveness calibrated by ancestral environments and transmitted across generations (Meaney, Champagne, Franklin, Dias & Ressler).

Cultural Learning Theory and Niche Construction
Explains how practices repeated over millennia crystallized into stable and transmissible psychic patterns (Henrich; Boyd & Richerson; Laland).

Philosophy of Mind, Emotions, and Society
Provides the conceptual framework for interpreting the relationships among body, affect, symbolism, power, and sociability (Merleau-Ponty; Schopenhauer; Foucault; Hobbes; Geertz).

1.4.3. A Hybrid Ontological Structure

The **Primordial Mind** emerges as a profoundly hybrid concept:

- **Biological**, insofar as it is grounded in universal neuroaffective systems;
- **Psychological**, insofar as it structures perceptual, motivational, and emotional tendencies;
- **Social**, insofar as it organizes bonds, coalitions, and hierarchies;
- **Cultural**, insofar as it is calibrated by transgenerational practices and pressures;
- **Philosophical**, insofar as it implies an ontology of the human prior to conscious thought and self-reflection.

This integration yields a model capable of articulating the levels of the hierarchical ontology presented earlier, sustaining the claim that the Primordial Mind constitutes the deep organizing axis of the human psyche.

1.4.4. Principle of Stratified Causality

The **Principle of Stratified Causality**, adopted by the Primordial Mind Theory, follows the tradition of behavioral biology and evolutionary psychology and is grounded in Tinbergen's (1963) classical formulation of the four types of causes underlying any behavioral phenomenon. Within this perspective, the Primordial Mind is understood as the point of convergence between neural mechanisms, ancestral social patterns, and incipient symbolic processes, emerging from the integrated interaction among four explanatory levels:

1. **Proximal Causes** – Immediate neuropsychological mechanisms that generate perception, affective valence, motivation, vigilance, defensive responses, sociability, and emotional regulation. These include subcortical circuits, primary affective systems, and socioaffective networks.
2. **Distal Causes** – The evolutionary history and Paleolithic selective pressures that shaped universal predispositions, bonding patterns, cooperative strategies, coalitional logic, status monitoring, and threat-detection mechanisms.

3. **Ontogenetic Causes** – Individual development, neural plasticity, epigenetic calibration, socialization, caregiving experiences, and cultural learning processes that modulate the expression and sensitivity of primordial systems across the lifespan.
4. **Functional Causes** – The adaptive value of emotional, motivational, and social systems, explaining why certain patterns—such as reciprocity, territoriality, cooperative caregiving, or hierarchy—were stabilized within the human lineage.

The Primordial Mind is thus understood as an emergent psychic structure produced by the stratified articulation of these four levels, uniting deep neurobiological dispositions, ancestral psychosocial patterns, and symbolic mechanisms that developed gradually over the course of human evolution. This approach allows the psyche to be described not as a monolithic phenomenon, but as an integrated system resulting from the superposition of historical, biological, developmental, and functional layers.

1.4.5. Epistemology of Integration

The epistemology underlying the **Primordial Mind Theory** is explicitly interdisciplinary, recognizing that the complexity of the human psyche cannot be explained by any single domain (biological, psychological, social, cultural, or philosophical). The theory is built upon three fundamental principles:

- **Multidimensional Coherence:** Each hypothesis must be compatible with neurobiological data, archaeological evidence, primate behavioral patterns, cross-cultural studies, and philosophical theories of mind.
- **Empirical Triangulation:** A mechanism is considered primordial only if it is observed in primate studies, documented in hunter-gatherer societies, exhibits basic neuroaffective correlates, and shows intercultural consistency.
- **Theoretical Iterativity:** The ontology is conceived as an expandable model, open to revision as new empirical evidence is produced.

To provide an explanatory framework, the theory integrates six primary fields and their respective authors:

- **Evolutionary Psychology:** Explains how selective pressures shape emotional and social predispositions (Tooby & Cosmides; Buss; Barrett; Kurzban).
- **Paleolithic Anthropology and Hunter-Gatherer Ethnography:** Supplies data on social organization, cooperative caregiving, coalitional aggression, and ritual practices (Lee, Boehm, Hrdy, Tomasello).
- **Affective and Social Neuroscience:** Describes the shared neural architecture underlying bonding, defense, status processing, and moral evaluation (Panksepp, LeDoux, Barrett, Pessoa, Sapolsky).
- **Transgenerational Epigenetics:** Accounts for mechanisms of stress sensitivity, affiliation, and threat response calibrated by ancestral environments (Meaney, Champagne, Franklin, Dias & Ressler).
- **Cultural Learning Theory and Niche Construction:** Grounds how practices repeated across generations crystallize into stable psychic patterns (Henrich; Boyd & Richerson; Laland).
- **Philosophy of Mind, Emotions, and Society:** Provides the conceptual lens for interpreting the relations among body, affect, symbolism, and power (Merleau-Ponty; Schopenhauer; Foucault; Hobbes; Geertz).

1.4.6. Integration of Disciplines

The **Primordial Mind Theory** integrates six major scientific fields, each contributing a complementary explanatory axis to the understanding of human psychic architecture. This interdisciplinary approach avoids reductionism by recognizing that the mind emerges from the interaction among biological, behavioral, social, cultural, and symbolic levels.

- **1. Evolutionary Psychology**

Provides the theoretical framework for how selective pressures shaped emotional, social, and motivational predispositions present across cultures. Central authors include Tooby and Cosmides, Buss, Barrett, and Kurzban.

- **2. Paleolithic Anthropology and Hunter-Gatherer Ethnography**

Supplies evidence concerning ancestral social organization, cooperative caregiving, coalitional aggression, early cultural transmission, and ritual practices. Notable contributors include Lee, Boehm, Hrdy, and Tomasello.

- **3. Affective and Social Neuroscience**

Describes the shared neural architecture supporting bonding, defense, status monitoring, empathy, cooperation, and moral evaluation. The contributions of Panksepp, LeDoux, Barrett, Pessoa, and Sapolsky are foundational.

- **4. Transgenerational Epigenetics**

Clarifies how experiences of caregiving, stress, affiliation, and threat modulate gene expression and calibrate socioaffective systems across generations. Key references include Meaney, Champagne, Franklin, and Dias and Ressler.

- **5. Cultural Learning Theory and Niche Construction**

Explains how practices and norms repeated within human groups form stable patterns of behavior and cognition, consolidating primordial mechanisms into enduring cultural traditions. Central contributions come from Henrich, Boyd and Richerson, and Laland.

- **6. Philosophy of Mind, Emotions, and Society**

Provides a conceptual framework for interpreting the relationships among body, affect, symbolism, power, and the construction of the self. Authors such as Merleau-Ponty, Schopenhauer, Foucault, Hobbes, and Geertz broaden the understanding of human affective and social life.

By integrating these six fields, the **Primordial Mind Theory** establishes a robust structure for understanding how ancestral neurobiological systems, pre-tribal social dynamics, and cultural and symbolic mechanisms converge in the formation of the human psyche.

1.4.7. Epistemological Consequence: The Primordial Mind as a Hybrid Concept

The principal epistemological consequence of the **Primordial Mind Theory** is the recognition that it constitutes a **hybrid concept**, situated at the intersection of biological, psychological, social, cultural, and philosophical dimensions of human experience. This multifaceted nature justifies the need for an integrative model to comprehend the psyche, avoiding reductionism while expanding the explanatory scope of the proposed ontology.

1. Hybrid Concept

The Primordial Mind encompasses multiple ontological dimensions:

- **Biological**, insofar as it is grounded in universal neuroaffective modules, ancestral motivational systems, and predispositions calibrated by selective pressures;

- **Psychological**, insofar as it structures perceptual, emotional, and motivational tendencies, as well as pre-reflective evaluative mechanisms;
- **Social**, insofar as it manifests in the formation of bonds, coalitions, hierarchies, and cooperative–competitive dynamics typical of small groups;
- **Cultural**, insofar as it is modulated, calibrated, and stabilized by transgenerational practices, normative transmission, and cumulative learning;
- **Philosophical**, insofar as it implies an ontology of the human prior to conscious thought, illuminating the relations among body, affect, normativity, power, and symbolization.

2. Justification for an Integrative Model

This hybrid nature grounds the necessity of a theory that articulates multiple levels of causality—neurobiological, developmental, ecological, social, and symbolic—thereby avoiding unidimensional explanations and enabling the psyche to be understood as a stratified, emergent, and historical system.

3. Scientific Legitimacy of the Proposed Ontology

The integration of evidence drawn from multiple disciplines strengthens the robustness and scientific legitimacy of the **Primordial Mind Theory**. By acknowledging the interdependence among levels of analysis ranging from the molecular to the cultural, the model offers an explanatory framework capable of unifying dispersed findings and generating testable predictions regarding human behavior, cultural variation, psychodynamic vulnerabilities, and universal mechanisms of sociality.

Epistemological and Interdisciplinary Foundation		
Discipline	**Contribution to the Primordial Mind**	**Key Authors**
Evolutionary Psychology	Selective pressures, adaptive modules, and emotional and social biases shaping psychic predispositions.	Cosmides, Tooby, Buss, Barrett, Kurzban
Paleolithic Anthropology and Hunter-Gatherer Ethnography	Ancestral ecology, band-level social structure, cooperative caregiving, conflict, coalitions,	Lee, Boehm, Hrdy, Tomasello, Wrangham, Sterelny

Epistemological and Interdisciplinary Foundation		
	cooperation, and early cultural transmission.	
Affective and Social Neuroscience	Defense systems, attachment, social reward, status monitoring, empathy, emotion regulation, and socioaffective neural circuits.	Panksepp, LeDoux, Barrett, Pessoa, Sapolsky
Transgenerational Epigenetics	Stress programming, attachment sensitivity, threat modulation, and intergenerational transmission of trauma and caregiving styles.	Meaney, Champagne, Yehuda, Szyf, Dias, Ressler
Cultural Learning Theory and Niche Construction	Cumulative culture, norms, prestige, conformity, social transmission, and gene–culture coevolution.	Henrich, Boyd, Richerson, Laland, Legare, Harris
Philosophy of Mind, Emotions, and Society	Conceptual frameworks addressing the body, affect, power, symbolization, normativity, and the constitution of the self.	Merleau-Ponty, Schopenhauer, Foucault, Hobbes, Geertz, Taylor

2. Central Hypothesis and Theoretical Foundation

2.1. Central Hypothesis

This article proposes an integrative ontology of the **Primordial Mind**, formalizing a neuroevolutionary model that articulates evidence from evolutionary psychology, affective neuroscience, Paleolithic anthropology, transgenerational epigenetics, cultural learning theory, and philosophy of mind. The aim is to provide a coherent, hierarchical, and empirically grounded theoretical framework capable of explaining the architecture of the human psyche. This objective addresses a theoretical gap: the lack of an integrative model describing the intermediate psychic architecture that mediates between inherited biological mechanisms, higher-order symbolic cognition, and cultural dynamics, as outlined in the introduction.

2.2. Specific Objectives

(1) Reconstruct the pre-tribal context (Level 0) as the selective platform of the human psyche
To describe the ecological, social, and developmental conditions that shaped universal psychological predispositions. This level constitutes the ecological matrix in which the components of the mind were selected.
To review evidence concerning nomadic bands, cooperative caregiving patterns, threat structures, bonding, coalitional aggression, and social learning. Relevant contributions include Dunbar's work on the "social brain," Sarah Hrdy's research on alloparental care, and Wrangham's analyses of coalitional aggression. Henrich's work on cumulative cultural transmission and cultural niche construction, as well as Tomasello's research on joint attention, selective imitation, and intention understanding, are also central.
To identify how persistent ecological pressures produced multigenerational behavioral regularities.

(2) Demonstrate how neurophysiological predispositions (Level 1) emerge from the interaction between biology, epigenetics, and cultural learning
To integrate affective neuroscience (Panksepp, 1998, 2012), active inference models (Friston, 2010), and core social brain systems (amygdala, orbitofrontal cortex, insula, anterior cingulate cortex). Section 6 details these components, including mesolimbic dopaminergic circuits and the role of the hippocampus.
To show how cultural and ecological regularities calibrate universal motivational and affective systems, highlighting the sensitivity of the Primordial Infrastructure to experience and epigenetic mechanisms. Key references include Adolphs (amygdala and threat detection), Whalen (amygdala and subliminal stimuli), Hrdy (alloparentality), Kelly (Paleolithic bands), and Meaney and Szyf (epigenetics and the HPA axis).

(3) Formalize the primordial mechanisms (Level 2) that organize human social life
To delineate mechanisms of relevance/vigilance, bonding, reciprocity, justice, aggression, and coalition formation.
To explain these mechanisms as products of the interaction between neural architecture and ancestral environments.
To relate them to evolutionary psychology models (Cosmides & Tooby; Buss; Barrett et al.), human ethology (de Waal), social neuroscience (Adolphs; Lieberman), and Paleolithic anthropology (Boehm; Kelly).

(4) Describe instinctive modules (Level 3) as phylogenetically grounded functional predispositions
To define how patterns of defense, mating, parental care, belongingness seeking, exploration, and energy economy emerge from the hierarchy of preceding levels. Section 8 discusses these modules as specialized neuroevolutionary circuits, drawing on Cosmides & Tooby, Hrdy, Wrangham, Panksepp, and LeDoux.
To integrate comparisons with primates (Wrangham; de Waal) and studies of human behavioral universals (Brown; Norenzayan).

(5) Specify the operation of prereflective triage (Level 4)
To characterize the intermediate domain between ancestral systems and deliberative cognition. Section 9 describes this process as an operational filter that selects and prioritizes stimuli.
To explain how emotions, mental imagery, salience, action tendencies, and implicit narratives emerge from interactions across levels.
To integrate literature on interoception, affective prediction, and salience, with emphasis on the anterior insula, anterior cingulate cortex (ACC), and amygdala.

(6) Integrate the emergence of the modern reflective mind (Level 5)
To explain the emergence of planning, abstract morality, self-awareness, and executive functions.
To articulate how this layer attempts to modulate primordial mechanisms, generating incompatibilities characteristic of modern life.
To ground this discussion in cognitive neuroscience (Miller; Badre; Goldberg) and symbolic anthropology (Geertz).

(7) Articulate transversal mechanisms connecting all levels
Interoception, social homeostasis, cumulative cultural transmission, epigenetics, intersubjective phenomenology, and biopolitics.
To explain how these mechanisms operate horizontally, modulating the expression of Levels 0–5.
To integrate contributions from Henrich, Laland, Boyd & Richerson, Foucault, and Merleau-Ponty.

(8) Construct testable predictions and falsification criteria
To identify which social, emotional, and cognitive phenomena are predicted by the model.
To propose empirical pathways (cross-cultural comparison, psychophysiology, longitudinal studies, computational modeling).
To clarify limits and conditions of refutation.

The central hypothesis posits the existence of a **Primordial Mind**, a structuring psychic layer formed within pre-tribal and early tribal contexts, operating as a neuroevolutionary infrastructure antecedent to conscious thought. This layer organizes perceptions, emotions, bonds, threat processing, status patterns, aggression, reciprocity, and affective imagination, functioning as the integrative axis of small-scale human social life.

The Primordial Mind is neither equivalent to isolated instincts, nor to modern symbolic cognition, nor to contingent cultural norms. Rather, it constitutes a hybrid system resulting from the convergence of:

- **Ancestral neurobiological predispositions** — documented in primary emotional systems (Panksepp), defense circuits (LeDoux), salience and interoceptive mechanisms (Barrett; Pessoa), and distributed socioemotional networks (Adolphs; Lieberman).

- **Hunter-gatherer patterns of sociality** — including cooperation, alloparental care, small-group ecology, coalitional aggression, and shared distributions of care and risk (Hrdy; Wrangham; Tomasello; Boehm; Kelly).
- **Cumulative cultural learning and niche construction** — which stabilized behavioral repertoires over thousands of years (Henrich; Boyd & Richerson; Laland).

This architecture generates probabilistic tendencies rather than strict determinisms. It explains why ancestral heuristics—vigilance, conditional reciprocity, affiliation, intuitive moral evaluation, status seeking, and coalitional polarization—continue to manifest in complex societies.

The Primordial Mind is universal yet highly calibratable through:

- Transgenerational epigenetics (Meaney; Szyf; Yehuda);
- Early socialization;
- Caregiving structures;
- Punishment–reward patterns;
- Cumulative cultural transmission;
- Ecological variation.

The modern symbolic–reflective mind (Level 5) emerges later as a modulatory layer that attempts to inhibit, reinterpret, or reorganize primordial mechanisms. This modulation, however, is partial, producing tensions characteristic of contemporary experience: moral dissonance, status conflicts, symbolic tribalism, vulnerability to affect-laden narratives, and identity crises.

Thus, the central hypothesis affirms that the **Primordial Mind** constitutes the universal psychological platform from which both instinctive modules and modern symbolic structures emerge, filling explanatory gaps that isolated disciplines are unable to integrate.

2.2. Specific Objectives

The specific objectives detail how the article seeks to demonstrate, decompose, and substantiate the central hypothesis across the levels of the proposed ontology.

(1) Reconstruct the pre-tribal context (Level 0) as the selective platform of the human psyche
To describe ecological conditions, environmental pressures, risks, dietary patterns, mobility rhythms, group sizes, and developmental dynamics that shaped universal psychological predispositions.
To integrate evidence from nomadic bands and cooperative caregiving structures (Hrdy), cognitive constraints of the social brain (Dunbar), coalitional aggression (Wrangham), cumulative cultural transmission and niche construction (Henrich), and joint attention and selective imitation (Tomasello).
To demonstrate how stable ecological pressures generated multigenerational regularities that became the foundation of the Primordial Mind.

(2) Demonstrate how neurophysiological predispositions (Level 1) emerge from the interaction between biology and ancestral ecology
To integrate affective neuroscience (Panksepp), active inference models (Friston), and core social brain systems (amygdala, orbitofrontal cortex, anterior cingulate cortex, insula, hippocampus).

To show how ecological regularities calibrate universal motivational and affective systems through plasticity, socialization, and epigenetic mechanisms.
To highlight key contributors, including Adolphs, Whalen, Hrdy, Kelly, Meaney, and Szyf.

(3) Formalize the primordial mechanisms (Level 2) that organize human social life
To delineate mechanisms of vigilance/relevance, bonding, reciprocity, intuitive justice, aggression, hierarchy, and coalition formation.
To integrate evolutionary psychology (Cosmides & Tooby; Buss; Barrett), human ethology (de Waal), social neuroscience (Adolphs; Lieberman), and Paleolithic anthropology (Boehm; Kelly).

(4) Describe instinctive modules (Level 3) as phylogenetically grounded functional predispositions
To define modules of defense, mating, parental care, belongingness, exploration, and energy economy.
To integrate findings from primatology (Wrangham; de Waal) and studies of cultural universals (Brown; Norenzayan).

(5) Specify prereflective triage (Level 4)
To characterize the intermediate domain responsible for selecting stimuli, priorities, and action tendencies.
To integrate literature on interoception, affective prediction, salience, and emotional imagery.

(6) Integrate the emergence of the modern reflective mind (Level 5)
To describe the emergence of planning, abstract morality, self-awareness, metacognition, and executive functions.
To relate these capacities to the tensions generated between primordial mechanisms and symbolic-modern demands.

(7) Articulate transversal mechanisms connecting all levels
Social homeostasis, interoception, epigenetics, cultural transmission, intersubjective phenomenology, and biopolitics.
Key authors include Henrich, Laland, Boyd & Richerson, Foucault, and Merleau-Ponty.

(8) Construct testable predictions and falsification criteria
To determine specific phenomena predicted by the model.
To propose empirical pathways, including psychophysiology, computational modeling, and cross-cultural and longitudinal studies.

2.3. Expected Contribution

By structuring the **Primordial Mind** as an integrative neuroevolutionary hierarchy, this work aims to:

- Provide a theoretical bridge between disciplines that traditionally operate in fragmented ways, including evolutionary psychology, affective neuroscience, anthropology, epigenetics, philosophy of mind, and cultural studies.
- Propose a functional model capable of guiding formal empirical research.
- Simultaneously explain:

- Universal regularities of the human species,
- Cultural variation, and
- Contemporary tensions between ancestral mechanisms and modern environments.

- Ground future conceptual, clinical, and methodological applications — including the future *Ajala Method* as an applied derivation.
- Establish a robust scientific ontology to serve as a foundation for philosophical, narrative, and experimental interpretations of the human mind.

Empirical Predictions Derived from the Ontology of the Primordial Mind			
Level / Mechanism	**Central Prediction**	**Method / Type of Evidence**	**Expected Phenomenon**
N0 – Pre-tribal context	Groups with higher levels of alloparental care exhibit more stable intergenerational cooperation	Comparative ethnography; cultural modeling	Positive correlation between cooperative caregiving and intergenerational cooperation
N1 – Neurobiological infrastructure	Histories of secure attachment are associated with reduced amygdala reactivity to social threats	fMRI; HPA-axis measures; attachment scales	Attenuated neural and hormonal responses to social rejection and threat cues
N2 – Vigilance/justice mechanisms	Increased reputational pressure heightens sensitivity to fairness violations in economic games	Ultimatum and altruistic punishment games; psychophysiology	Greater punishment of norm violators; increased insula and ACC activation in response to injustice
N3 – Coalitional modules	Salient external threats increase ingroup cohesion and support for prestige-based leadership	Symbolic threat experiments; longitudinal surveys	Greater ingroup favoritism, willingness to sacrifice for the group, and deference to status figures
N4 – Prereflective affective triage	Interoceptive interventions modify rapid social choices under uncertainty	Breathing training; bodily focus manipulation; rapid social decision tasks	Shifts in approach–avoidance responses and attentional biases toward social cues

Empirical Predictions Derived from the Ontology of the Primordial Mind			
Transversal mechanisms – Epigenetics	Intergenerational trauma is associated with specific epigenetic patterns and heightened social vigilance	Epigenetic studies; threat recognition tasks	Altered methylation in stress-related genes and increased attentional bias toward threatening stimuli

3. The Proposal of the Ontology of the Primordial Mind

The Ontology of the Primordial Mind proposes an integrated hierarchical structure of human psychic architecture, organized into six levels (0 to 5) that represent distinct classes of processes—ecological, neurophysiological, functional, instinctive, phenomenological, and cognitive. Its central aim is to demonstrate how inherited predispositions, socioemotional mechanisms, and modern symbolic cognition emerge, interact, and mutually modulate within a single system organized by vertical dependencies and horizontal influences.

The **Primordial Mind** is defined as an integrated set of neurocognitive and socioemotional processes shaped by hundreds of thousands of years of pre-tribal and early tribal pressures. It operates as a neuroevolutionary infrastructure prior to conscious thought, responsible for organizing perception, emotion, bonding, hierarchy, threat, aggression, reciprocity, and affective imagination. It is not reducible to isolated instincts, modern cognition, or culture; rather, it constitutes the structural foundation upon which instincts, social modules, and symbolic rationality are built.

3.1. Level 0 — Pre-Tribal Context (Ancestral Selective Platform)

Level 0 describes the ancestral ecology that shaped the human mind over tens of thousands of generations. It constitutes the selective platform from which broad and universal psychic predispositions emerged.

Its core elements include:

- Small-scale nomadic bands (15–50 individuals), highly mobile;
- Functional egalitarianism, with prestige based on competence rather than coercion;
- Alloparental care, division of labor, and intensive cooperation;
- Recurrent threats, including predators, intergroup conflict, and environmental instability;
- Primitive cultural transmission through imitation, observation, ritual, and storytelling;
- Ancestral childhood development providing universal prototypes for bonding, selective imitation, and norm acquisition.

Researchers such as Lee, Boehm, Hrdy, and Tomasello provide robust foundations for this level, elucidating the relationships among social ecology, cooperative care, coalitional aggression, and shared learning mechanisms.

3.2. Level 1 — Primordial Infrastructure (Calibrated Neurophysiological Predispositions)

Level 1 comprises the psychoneurobiological predispositions stabilized by the selective environment of Level 0. It forms the basal layer of primitive mental architecture and is responsible for:

- Primary affective systems (seeking, fear, rage, care, panic–separation);
- Rapid threat-detection circuits (amygdala; hypothalamus);
- Bonding systems, social pain, and reward;
- Homeostasis and interoception (bodily indices shaping valence);

- Socioemotional circuits: amygdala, OFC, ACC, insula, hippocampus;
- Neuroendocrine stress axes (HPA), modulated epigenetically;
- Universal tendencies toward belonging, vigilance, reciprocity, and status monitoring;
- General principles of active inference (prediction, surprise minimization).

Foundational authors include Panksepp, Friston, LeDoux, Barrett, Pessoa, Sapolsky, Meaney, and Szyf.

3.3. Level 2 — Primordial Mechanisms (Functional Systems of Social Processing)

Level 2 organizes adaptive socioecological functions that emerge directly from the neurophysiological predispositions of Level 1. These mechanisms constitute the functional "engine" of ancestral social life:

- Relevance and vigilance systems;
- Bonding and cooperative care;
- Reciprocity and intuitive justice;
- Status monitoring, prestige, and dominance;
- Defensive and coalitional aggression;
- Affective imagination and social simulation (projections, expectations, scenarios).

This layer integrates evidence from evolutionary psychology (Cosmides & Tooby; Buss; Barrett), human ethology (de Waal), social neuroscience (Adolphs; Lieberman), and Paleolithic anthropology (Boehm; Kelly).

3.4. Level 3 — Primordial Modules (Phylogenetic Functional Predispositions)

Level 3 encompasses broad motivational systems—instinctive modules—that structurally depend on lower levels to emerge and operate. These include:

- Defense and flight;
- Sexuality and mating strategies;
- Parental care and alloparental attachment;
- Belonging, tribalism, and coalitional recognition;
- Status competition and prestige seeking;
- Exploration–curiosity and cost aversion (energy economy).

These modules are specialized neuroevolutionary circuits informed by primate comparisons (Wrangham; de Waal), studies of human universals (Brown; Norenzayan), and evolutionary models (Cosmides & Tooby; Hrdy; Panksepp; LeDoux).

3.5. Level 4 — Prereflective Triage (Affective–Sensorimotor Interface)

Level 4 is the intermediate layer in which:

- Emotions become action tendencies;
- Mental images become implicit narratives;
- Bodily states shape perception, salience, and decision-making;
- Primordial mechanisms are expressed at a preverbal phenomenological level.

It includes:

- Filters of trustworthiness, intention, and threat;
- Rapid social evaluation;
- Affective prioritization of stimuli;
- Formation of implicit tribal identity.

This level is examined in the literature on interoception, affective prediction, salience, ACC, anterior insula, amygdala, active inference, and embodied phenomenology.

3.6. Level 5 — Modern Reflective Mind (Symbolic Cognition and Executive Control)

Level 5 represents the most recent and uniquely human layer, responsible for:

- Complex language and symbolism;
- Abstract thought and planning;
- Cultural narrative and memetic transmission;
- Autobiographical self-awareness;
- Normative morality and metacognition;
- Executive functions (inhibition, monitoring, coordination).

This layer attempts to modulate, reinterpret, or contain mechanisms from lower levels, generating characteristic tensions of modern life: status conflicts, symbolic tribalism, cognitive overload, moral dissonance, social anxiety, and identity inconsistencies.

Key authors include Miller, Badre, Goldberg, and Geertz.

3.7. Transversal Mechanisms (Processes Operating Across All Levels)

These are horizontal systems that modulate interactions across Levels 0 to 5:

- Interoception and autonomic regulation;
- Social homeostasis (belonging, status, justice);
- Cumulative cultural transmission (Boyd, Richerson, Henrich);
- Transgenerational epigenetics (Meaney; Szyf; Yehuda);
- Intersubjective phenomenology (Merleau-Ponty; Husserl);
- Biopolitics and normativity (Foucault);
- Active inference as a unifying mechanism.

These processes confer plasticity and contextual adaptation, modulating the expression of each level according to environment, culture, and experience.

3.8. Structural Synthesis

The Ontology of the Primordial Mind constitutes a hierarchical, neuroevolutionary, and interdisciplinary model of psychic architecture. It integrates:

- Affective and social neuroscience,

- Evolutionary psychology,
- Paleolithic anthropology,
- Transgenerational epigenetics,
- Cultural learning theory,
- Philosophy of mind and action.

The model articulates Tinbergen's four causes (1963)—phylogenetic, ontogenetic, functional, and mechanistic—into a coherent system capable of:

- Generating testable predictions,
- Explaining universal regularities,
- Accommodating cultural variation,
- And connecting biological mechanisms to symbolic processes.

Levels of the Ontology of the Primordial Mind

Level	Name	Type of Processes	Core Examples
N0	Pre-Tribal Context	Selective ecological and social conditions	Nomadic bands, alloparental care, ancestral ecology, coalitional aggression, early cumulative culture
N1	Primordial Neurobiological Infrastructure	Evolutionarily calibrated neurophysiological predispositions	Basic affective systems, amygdala, hippocampus, insula, ACC, HPA axis, interoception
N2	Primordial Mechanisms	Functional systems of social processing	Vigilance, social reading, relevance detection, territoriality, coalition formation
N3	Primordial Modules	Emergent instinctive patterns	Reciprocity, parental care, prestige seeking, coalitional competition, defense/flight
N4	Prereflective Triage	Affective–sensorimotor interface	Rapid social evaluation, salience attribution, action tendencies, preconscious processing
N5	Modern Reflective Mind	Symbolic cognition and executive control	Language, abstract thought, planning, autobiographical identity, morality

Levels of the Ontology of the Primordial Mind			
Transversal	—	Processes that modulate all levels	Interoception, cultural learning, active inference, epigenetics, social homeostasis

4. Theoretical Methodology and Criteria for Multidisciplinary Integration

The methodology of the Ontology of the Primordial Mind is explicitly multidisciplinary. It is grounded in the assumption that the human psyche cannot be adequately explained within a single domain—whether neuroscience, psychology, anthropology, philosophy, or biology. Instead, it requires a multilevel integrative framework consistent with the causal articulation proposed by Tinbergen (1963), in which phylogenetic, ontogenetic, mechanistic, and functional aspects are integrated into a continuous theoretical system.

The present ontology organizes conceptual integration through a set of structuring methodological principles that guide the inclusion of evidence, avoid reductionism, prevent syncretism, and ensure that the model remains empirically anchorable.

4.1. Fundamental Methodological Principles

1. Principle of Ontological Stratification

The human mind is treated as a multilevel system:

- Lower levels (neurobiology, instincts) create constraints and possibilities;
- Higher levels (language, culture, rationality) generate modulations and reorganizations.

No single level fully explains the system.

This principle preserves explanatory depth by avoiding:

- Rigid neurobiological reductionism,
- Extreme socioconstructivism,
- “Tabula rasa” models.

It is aligned with approaches by Simon, Anderson, Dehaene, and Henrich, who argue for distributed, adaptive, and hierarchically organized cognitive systems.

2. Principle of Evolutionary Continuity

The explanation of psychic mechanisms requires a continuous phylogenetic trajectory connecting:

- Pre-tribal pressures,
- Tribal patterns of sociability,
- Comparisons with non-human primates,
- And the emergence of modern cognition.

This grounds the concept of the *Primordial Mind* as a stable neuroevolutionary infrastructure that persists in the contemporary mind, even beneath relatively recent cultural layers.

3. Principle of Independent Convergent Evidence

Only mechanisms supported by convergent empirical evidence from multiple fields are incorporated, including:

- Neuroimaging,
- Comparative psychology,
- Hunter-gatherer anthropology,
- Evolutionary models,
- Child development,
- Epigenetics,
- Behavioral studies.

This principle prevents *ad hoc* speculation and ensures that each component of the ontology is multiply validated.

4. Principle of Ecological Functionality

Each mechanism of the Primordial Mind is evaluated according to the criterion:
"What was its function in the ancestral environment, rather than its modern function?"

This prevents anachronistic interpretations and preserves evolutionary coherence.
The approach is derived from Tooby & Cosmides, while incorporating:

- Epigenetic plasticity,
- Cumulative cultural learning,
- And a rejection of extreme rigid modularity.

5. Principle of Biosociocultural Bidirectionality

Culture is not external to biology.
There is coevolution:

- Biological predispositions shape possible cultural practices;
- Cultural practices alter selective pressures, epigenetic expression, and developmental patterns.

This principle ensures that the model is neither biologistic nor culturalist.

6. Principle of Embodied Phenomenology

The model integrates classical phenomenology (Husserl, Merleau-Ponty) and contemporary phenomenology (Gallagher, Zahavi), assuming that:

- Perception is embodied;
- Emotional experience has a prereflective structure;
- Intentionality is modulated by affective states;
- Intersubjectivity emerges from embodied and pre-verbal mechanisms.

This principle connects:

- Neurobiological levels,

- Primordial mechanisms,
- Prereflective triage (N4),
- And subjective experience.

7. Principle of Flexible Modularity

The ontology adopts a weak, dynamic, and non-rigid form of modularity.
It engages with:

- Boyd & Richerson (gene–culture coevolution),
- Henrich (cultural evolution),
- Laland (niche construction),
- Tomasello (shared intentionality),
- Barrett, Kurzban, and Sperber (functional modularity),
- Gazzaniga and Dehaene (dynamic architectures and global workspace models).

This implies:

- Specialized but highly interactive modules;
- Experience-dependent plasticity;
- Overlap, competition, and culturally modulated reorganization.

8. Principle of Epistemic Symmetry

No single discipline is privileged.
Each field contributes a specific type of causality:

- Neuroscience → physiological constraints;
- Anthropology → social ecology and ancestral patterns;
- Philosophy → conceptual coherence;
- Experimental psychology → functions and causal correlations;
- Epigenetics → plasticity and environmental calibration;
- Phenomenology → the structure of experience and intentionality.

The theory operates through inter-field coherence.

9. Principle of Complex Parsimony

The model avoids both an excess of mechanisms and impoverishing minimalism.
A component is included only if it:

- Has robust empirical support;
- Possesses a clear ecological function;
- Improves explanatory power;
- Cannot be reduced to other mechanisms already described.

This principle maintains the ontology as elegant, streamlined, and functionally precise.

10. Principle of Structured Testability

Although it is an ontology, the framework:

- Generates behavioral predictions;
- Is compatible with experimental findings;
- Guides testable hypotheses;
- Allows indirect falsification through empirical convergence.

It functions as a high-level guiding theory, with heuristic power and the capacity to orient research programs.

4.2. Contributing Fields of the Ontology

The theory articulates six principal fields, each providing an explanatory axis of the multilevel system of the Primordial Mind.

1. Evolutionary Psychology
Explains how selective pressures shaped social and emotional predispositions.
Key authors: Tooby & Cosmides, Buss, Barrett, Kurzban.

2. Paleolithic Anthropology and Hunter-Gatherer Ethnography
Describes the structuring dynamics of Level 0: social organization, cooperative care, coalitional aggression, and ritual practices.
Key authors: Lee, Boehm, Hrdy, Tomasello.

3. Affective and Social Neuroscience
Provides the shared neural mechanisms that support bonding, threat detection, status regulation, morality, and social inference.
Key authors: Panksepp, LeDoux, Barrett, Pessoa, Sapolsky.

4. Transgenerational Epigenetics
Explains how ancestral environments calibrate sensitivity to stress, affiliation, and threat.
Key authors: Meaney, Champagne, Szyf, Franklin, Dias & Ressler.

5. Cultural Learning Theory and Niche Construction
Demonstrates how repeated practices crystallize into transgenerational mental structures.
Key authors: Henrich, Boyd & Richerson, Laland.

6. Philosophy of Mind, Emotions, and Society
Provides the conceptual framework for interpreting embodiment, affect, symbolism, narrative, and power.
Key authors: Merleau-Ponty, Schopenhauer, Foucault, Hobbes, Geertz.

4.3. Methodological Synthesis

The *Primordial Mind* is a hybrid concept:

- **Biological**, insofar as it emerges from universal neuroaffective modules;
- **Psychological**, insofar as it structures perceptual, emotional, and motivational tendencies;
- **Social**, insofar as it organizes bonds, cooperation, coalitions, and hierarchies;

- **Cultural**, insofar as it is calibrated by practices and transgenerational transmission.

The methodology ensures that the ontology is:

- Empirically grounded,
- Philosophically coherent,
- Anthropologically contextualized,
- Neurobiologically plausible,
- And phenomenologically anchored.

Multidisciplinary Integration Matrix of the Primordial Mind Theory

Discipline	What it provides	Who receives it	Type of contribution	Direct examples in the theory
Paleolithic Anthropology	Ancestral ecology, band-based social structures, cooperative caregiving, coalitional aggression, rituals	Evolutionary Psychology, Social Neuroscience, Epigenetics, Philosophy	Selective ecological and social context (Level 0)	Selective pressures; egalitarian hierarchy; male coalitions; alloparental care
Evolutionary Psychology	Functional models of adaptiveness, emotional modularity, social heuristics, behavioral predispositions	Neuroscience, Philosophy of Mind, Cultural Learning	Adaptive functions and selection hypotheses	Vigilance, reciprocity, intention checking, status mapping
Affective and Social Neuroscience	Subcortical systems; threat, bonding, reward and salience circuits; neural correlates of affect and behavior	Evolutionary Psychology, Anthropology, Epigenetics, Phenomenological Philosophy	Foundational neurophysiological mechanisms (Level 1)	Amygdala, ACC, insula, oxytocin, social pain (ACC), mesolimbic dopamine

Multidisciplinary Integration Matrix of the Primordial Mind Theory				
Transgenerational Epigenetics	Environmental calibration mechanisms, stress/affection effects, HPA-axis plasticity	Neuroscience, Developmental Psychology, Anthropology, Cultural Learning	Individual variation and plasticity (Level 1 → Level 2)	Maternal-care–related methylation, transgenerational trauma, epigenetic calibration of threat
Cultural Learning and Niche Construction	Cumulative norms, vertical/oblique transmission, rituals, stabilized practices, cultural selection	Evolutionary Psychology, Neuroscience (via plasticity), Anthropology, Social Philosophy	Cultural crystallization mechanisms (Levels 0–5)	Prestige bias, conformity, selective imitation, complex cultural niche
Philosophy of Mind and Phenomenology	Structure of experience, affective intentionality, embodiment, power, narrative and self	Neuroscience, Social Psychology, Cultural Learning	Conceptual framework for interpreting Levels 2–5	Pre-reflexivity, body as the first level of meaning, disciplinary power
Political and Social Philosophy	Power structures, social organization, sovereignty, cooperation and conflict	Evolutionary Psychology, Anthropology, Cultural Learning	Interpretation of status mechanisms, coalitions and morality	Hobbes; Foucault — links between body, authority and social regulation
Developmental Psychology	Maturational trajectories, sensitivity to caregiving, critical periods	Epigenetics, Evolutionary Psychology, Neuroscience	Ontogeny as an integrative axis (epigenetics + socialization)	Affiliation, temperament, early attachment patterns

Lateral Connections:
EPIGENETICS ↔ NEUROSCIENCE ↔ CULTURAL LEARNING ↕ ↕ ↕ **PHENOMENOLOGY ↔ SUBJECTIVE EXPERIENCE ↔ SOCIOCULTURAL IDENTITY**

Summary of the Integrative Logic

- Anthropology provides the selective environment.
- Evolutionary psychology defines functions.
- Neuroscience maps mechanisms.
- Epigenetics provides calibration.
- Cultural learning produces transgenerational stability.
- Philosophy offers ontological and epistemological coherence.

Together, they form the structural logic that grounds:
→ **The Primordial Mind as a multilevel neuroevolutionary ontology.**

5. Level 0 — Epistemological Framework and Theoretical Delimitation of the Primordial Mind, and Synthesis of the Levels

The formulation of the Theory of the Primordial Mind requires an epistemological approach capable of integrating multiple scientific domains, respecting distinct layers of causality, avoiding reductionisms, and articulating biological, social, and symbolic processes within a single operational ontology. This chapter establishes the epistemic foundations of the theory, its criteria for multidisciplinary integration, and the manner in which different fields of knowledge converge to support the proposed hierarchical model.

The proposal recognizes that the human psyche emerges from complex relations among ancestral ecological pressures, neurobiological predispositions, socioemotional mechanisms, phylogenetic instinctual patterns, pre-reflective processes, and modern symbolic cognition. Accordingly, the Primordial Mind does not derive from a single discipline, but from a constellation of scientific traditions whose findings converge toward the construction of a multilevel model consistent with ethological, neuroscientific, anthropological, and phenomenological evidence.

5.1. Theoretical Methodology and Criteria for Multidisciplinary Integration

The theoretical methodology of the Theory of the Primordial Mind is explicitly interdisciplinary. No single domain is sufficient to fully explain the architecture of the human psyche. For this reason, the model adopts methodological principles designed to ensure rigor, coherence, and empirical compatibility across diverse fields.

Fundamental Methodological Principles

1. Principle of Ontological Stratification
The mind is conceived as a multilevel system in which lower layers (N0–N3) constrain and enable, while higher layers (N4–N5) reorganize, modulate, and reinterpret. This principle avoids both strict neurobiological reductionism and extreme socioconstructivism, aligning with complex systems models (Simon, Anderson, Dehaene, Henrich).

2. Principle of Evolutionary Continuity
Psychic mechanisms are situated within a continuous phylogenetic arc, derived from pre-tribal and tribal contexts, preserving structural traits while incorporating cultural plasticity. In this sense, the Primordial Mind is a neuroevolutionary infrastructure calibrated by ancestral selective pressures.

3. Principle of Independent Convergence of Evidence
Each mechanism is included only when supported by convergent data from neuroscience, ethnography, comparative psychology, evolutionary models, epigenetics, and experimental psychology. This criterion prevents ad hoc speculation and sustains the empirical robustness of the ontology.

4. Principle of Ecological Functionality
The interpretation of primordial mechanisms is guided by their function in the ancestral environment—not by their contemporary expression. This approach allows instincts, social modules, and emotional predispositions to be understood within their original adaptive context.

5. Principle of Biosociocultural Bidirectionality
Biology and culture mutually influence one another. Cumulative cultural transmission alters selective pressures, while biological predispositions shape cultural constraints and affordances.

6. Principle of Embodied Phenomenology
Subjective experience possesses a pre-reflective, embodied, interoceptively modulated, and sensorimotor structure. This principle enables the articulation of Levels N2–N4 with lived states, affective intentionality, and narrative formation.

7. Principle of Flexible Modularity
The model adopts a weak form of functional modularity: specialized modules that are highly interactive, plastic, overlapping, and modulated by culture and experience.

8. Principle of Epistemic Symmetry
No discipline occupies a hierarchically superior position. The model depends on cooperation among neuroscience, anthropology, philosophy, experimental psychology, phenomenology, and epigenetics.

9. Principle of Complex Parsimony
The theory is minimalistic in its number of structural mechanisms, avoiding unnecessary conceptual inflation.

10. Principle of Structured Testability
Although an ontology is abstract, it must generate observable predictions, testable hypotheses, and indirect criteria for falsification.

5.2. Empirical Evidence and Foundational Authors Related to the Ontology of the Primordial Mind

The Theory of the Primordial Mind is grounded in a corpus of evidence drawn from neuroscience, evolutionary anthropology, developmental psychology, comparative primate studies, epigenetics, cultural psychology, and philosophy of mind.

Below, key authors and findings are organized by ontological level.

Level 0 — Ancestral Ecology and Selection

- Boehm (egalitarianism, cooperative punishment)
- Hrdy (cooperative care and alloparenting)
- Dunbar (social brain hypothesis)
- Wrangham (coalitional aggression)
- Tomasello (cooperation and shared intentionality)

Level 1 — Neurophysiological Predispositions

- Panksepp (primary affective systems)
- LeDoux (defense systems and the amygdala)
- Adolphs (social perception)
- Friston (active inference)

- Meaney & Szyf (epigenetics and stress)

Level 2 — Primordial Functional Mechanisms

- Tooby & Cosmides (adaptive social systems)
- Buss (universal social strategies)
- Tomasello (cooperative norms)
- Sapolsky (status and behavior)
- Singer & Decety (empathy and morality)

Level 3 — Phylogenetic Instinctual Modules

- Cosmides & Tooby
- de Waal (human ethology)
- Brown (human universals)
- Norenzayan (morality and cultural psychology)

Level 4 — Pre-Reflective Filtering

- Craig (interoception and anterior insula)
- Barrett (emotion construction)
- Pessoa (emotion–cognition integration)
- Whalen (subliminal amygdala processing)

Level 5 — Symbolic Cognition

- Dehaene (language, consciousness, global workspace)
- Badre & Miller (executive control)
- Geertz (culture and symbolism)
- Taylor (modern identity)

This convergence constitutes the empirical grounding that sustains the ontological plausibility of the Primordial Mind.

5.3. Phenomena Explained by the Ontology of the Primordial Mind in Relation to Other Approaches

Below, a comparative framework highlights phenomena that the ontology explains in an integrated manner, but which appear fragmented or peripheral in other approaches. This is not a critique of individual authors, but a recognition of scientific complementarity. As an expression of intellectual humility, the following reflection is included:

"If I have seen further, it is by standing on the shoulders of giants—and this model exists because it dialogues with decades of foundational work."

Phenomena and Unique Explanatory Contributions		
Phenomenon Explained by the Ontology	**Primordial Mind Approach**	**Related Authors (not mutually integrated)**
Conflict between modern cognition and ancestral mechanisms	Vertical articulation across N0–N5 and evolutionary temporality	Sapolsky; Cosmides; Dehaene
Contemporary digital tribalism	Coalition modules (N3) + affective salience (N4)	Boyd & Richerson; Norenzayan
Hypersensitivity to social rejection	Transversal social homeostasis + N2	Hrdy; Dunbar; Eisenberger
Pre-reflective morality	N4 as an implicit moral filter	Haidt; Tomasello; Greene
Psychic energy economy	Active inference + phylogenetic modules	Friston; Porges; Panksepp
Why some emotions become narratives	N4 → N5 transition and salience selection	Barrett; Pessoa; Craig
Universality of social patterns	N3 + cumulative cultural transmission	Henrich; Brown; Laland
Tendency toward coalitions and group conflict	Integrated N2–N3 mechanisms	Wrangham; de Waal; Boehm
Crisis of the modern self	N5 overload vs. primordial mechanisms	Taylor; Bauman; Giddens
Affectivity in self-consciousness	Interoception + primordial infrastructure	Damasio; Merleau-Ponty; Gallagher
Gene–culture coevolution	Transversal mechanisms	Henrich; Mesoudi; Laland
Contemporary polarization	Ancestral modules activated within digital ecologies	Haidt; Tomasello; Boyd & Richerson

5.4. Model Stabilization – Synthesis of Levels

The Ontology of the Primordial Mind, structured into six hierarchical levels (0 to 5) and regulated by transversal mechanisms, describes the human psyche as an evolutionarily stratified, functionally integrated, and dynamically modulable system.
In this chapter, we formalize the internal coherence of the model by articulating:

- The vertical relationships between levels,
- The horizontal processes that cut across the entire hierarchy,
- The systemic functioning of the psychic architecture,
- Comparisons with existing ontologies,
- And the phenomena that the model explains in a unique way.

The objective is to demonstrate that the Primordial Mind is not merely a collection of layers, but a coherent neuroevolutionary system capable of capturing the complexity of the human psyche within an integrative and predictive theory.

5.4.1. Vertical Relationships Between Levels

The vertical structure of the Primordial Mind forms a phylogenetic and functional axis in which each level:

- Emerges from the previous one,
- Depends structurally on lower layers,
- Modulates and reorganizes higher levels.

The relationship between levels can be summarized as a system of constraints and possibilities.

Level 0 → Level 1

The pre-tribal context provides the ecological matrix that selects and stabilizes:

- Threat systems,
- Cooperative bonds,
- Hierarchies,
- Care patterns,
- Joint attention.

Ancestral selective pressures shape the **Primordial Infrastructure (N1)**, calibrating basic circuits of emotion, sociality, and inference.

Level 1 → Level 2

The Primordial Infrastructure generates functional mechanisms operating as systems of:

- Vigilance and relevance,
- Justice and reciprocity,
- Coalitions and alliances,
- Territoriality and intention recognition.

These mechanisms constitute the **Primordial Mechanisms (N2)**, expanding adaptive social and ecological functions.

Level 2 → Level 3

From these mechanisms emerge universal instinctive patterns (N3), such as:

- Parental care,
- Prestige seeking,
- Coalitional defense,
- Mating strategies,
- Energetic economy,
- Tribality,
- Exploration and curiosity.

N3 represents the level of **“instinctive grammar,”** dependent on the socio-emotional mechanisms of N2.

Level 3 → Level 4

Instinctive modules are filtered by **Pre-Reflective Appraisal (N4)**, which determines:

- What becomes conscious emotion,
- Which stimuli gain salience,
- Which implicit narratives are activated,
- Which actions are prepared.

N4 converts predispositions into lived experience, prior to language.

Level 4 → Level 5

Pre-reflective appraisal provides the raw material for the **Modern Reflective Mind (N5)**, which includes:

- Symbolic cognition,
- Language,
- Cultural narrative,
- Abstract thinking,
- Normative morality.

N5 reorganizes N4 — but never replaces it.

Conclusion of the Vertical Structure

Each level is:

- Necessary,
- Insufficient in isolation,
- Functionally intertwined.

The Primordial Mind is therefore a vertical system of **stratified causality**.

5.4.2. Horizontal Relationships – Transversal Mechanisms

Transversal mechanisms are processes that cut across all levels of the ontology and regulate the expression of the system as a whole. They include:

(1) Interoception and autonomic regulation

Internal bodily perception influences:

- Emotional appraisal (N1),
- Stimulus prioritization (N2),
- Module activation (N3),
- Action tendencies (N4),
- Self-concept and narrative (N5).

(2) Social homeostasis

The ancestral pursuit of:

- Belonging,
- Status,
- Justice,
- Reciprocity,

Operates simultaneously across all levels.

(3) Cumulative cultural transmission

Culture modulates:

- Epigenetic expression (N1),
- Social mechanisms (N2),
- Instinctive modules (N3),
- Pre-reflective filters (N4),
- Language and morality (N5).

(4) Transgenerational epigenetics

Experiences of:

- Stress,
- Care,
- Violence,
- Affiliation,

Calibrate affective and perceptual systems, modulating the entire psychic structure.

(5) Active inference and affective prediction

The brain "models the world" bottom-up and top-down, integrating:

- Body,

- Emotion,
- Action,
- Thought,
- Culture.

(6) Intersubjective phenomenology

Embodied human contact (gaze, touch, posture) traverses all levels, structuring:

- Identity,
- Recognition,
- Cooperation,
- Morality.

5.5. Complete Functional Architecture

The ontology can be summarized as a system composed of:

(A) Ancestral base (N0–N1)
Provides phylogenetic stability.

(B) Socio-emotional organization (N2–N3)
Generates universal behavioral patterns.

(C) Interface of experience (N4)
Determines how the individual lives the world.

(D) Symbolic cognition (N5)
Reinterprets, but does not replace, the ancestral system.

The model is therefore:

- Hierarchical,
- Interactive,
- Predictive,
- Culturally modulable,
- Biologically grounded.

5.6. Comparison with Existing Models

The Primordial Mind overcomes limitations of:

Classical Evolutionary Psychology
→ excessive rigid modularity;
→ weak integration with affective neuroscience.

Isolated Affective Neuroscience
→ lack of articulation with evolutionary history and culture.

Phenomenology and social philosophy
→ absence of a neuroevolutionary foundation.

Cultural anthropology
→ limited capacity to explain universal predispositions.

Symbolic cognition models
→ neglect of ancestral layers shaping rationality.

The ontology integrates what these models explain only partially.

5.7. What the Ontology Explains That Other Models Do Not

The Primordial Mind enables understanding of phenomena located between biology and culture — a traditionally neglected zone:

Phenomena explained by the model:

- Modern tribalism (online and offline);
- Status crises and suffering;
- Formation of intuitive moralities;
- Extreme sensitivity to rejection;
- The "affective agenda" of cognition;
- Paradoxes of human cooperation;
- Coalitional violence;
- Fascination with symbolic narratives;
- Modern dissonances (chronic stress, burnout, identity emptiness, etc.).

The ontology explains why modern cognition and primordial mechanisms collide, producing conflicts typical of contemporary life.

5.8. Empirical Evidence and Foundational Authors Related to the Ontology of the Primordial Mind

The Theory of the Primordial Mind is supported by a robust body of evidence drawn from multiple scientific fields. This multidisciplinary convergence sustains the validity of the six hierarchical levels and the transversal mechanisms. Below, key authors and articles associated with each part of the ontology are organized:

● Level 0 — Pre-Tribal Context (Ecology and Ancestral Social Selection)

Empirically grounded in:

- Christopher Boehm (1999, 2012) — social selection, cooperative punishment, egalitarian bands.
- Sarah Blaffer Hrdy (2009) — cooperative care, alloparenting, evolution of empathy.
- Richard Wrangham (2019) — coalitional aggression and collective violence.
- Robin Dunbar (1992, 2003, 2016) — social cognition, group size, social brain hypothesis.
- Kim Hill & Michael Gurven (2010) — hunter-gatherer behavioral ecology.

Key articles:

- Dunbar, 1992 — *Neocortex size as a constraint on group size.*
- Hill et al., 2011 — *Co-residence patterns in hunter-gatherers.*
- Wrangham & Glowacki, 2012 — *Intergroup conflict and coalitional psychology.*

● Level 1 — Primordial Infrastructure (Affective and Social Neuroscience)

Classical and contemporary neurobiological foundations:

- Jaak Panksepp (1998, 2012) — primary affective systems (SEEKING, FEAR, CARE).
- Joseph LeDoux (1996, 2015) — amygdala, defense, affective mapping.
- Antonio Damasio (1994, 2010) — somatic markers and body-affect integration.
- Daniel Schacter; Randall O'Reilly — memory, prediction, hippocampal circuits.
- Ralph Adolphs (2002–2023) — social perception and emotional recognition.
- Karl Friston (2010–) — active inference, prediction, affective salience.

Key articles:

- Panksepp, 2012 — *Primary-process affective neuroscience.*
- Barrett & Satpute, 2013 — *Large-scale brain networks in affect.*
- Adolphs, 2009 — *The social brain.*
- Friston, 2010 — *The free-energy principle.*

● Level 2 — Primordial Mechanisms (Vigilance, Bonds, Justice, Coalition)

Essential authors:

- Tooby & Cosmides (1992–2016) — adaptive architecture of the mind.
- Buss (2019) — universal social strategies.
- Michael Tomasello (1999–2020) — shared intentionality, cooperative norms.
- Robert Sapolsky (2017) — neurobiology of status and social behavior.
- Jean Decety & Tania Singer (2010–) — empathy, morality, social systems.

Key articles:

- Tomasello, 2016 — *A natural history of human morality.*
- Boyd & Richerson, 2005 — *The evolution of cooperation.*

● Level 3 — Instinctive Modules (Functional Phylogenesis)

References:

- Cosmides & Tooby (1994–2013) — evolutionary modularity.
- Frans de Waal (1996–2022) — primate and human ethology.
- Donald Brown (1991) — human universals.
- Norenzayan (2013) — universal cultural psychology and morality.
- Wrangham & Peterson (1996) — phylogenesis of aggressive behavior.

● Level 4 — Pre-Reflective Appraisal (Salience, Interoception, Affective Attribution)

Core authors:

- Bud Craig (2009–2015) — interoception and anterior insula.
- Lisa Feldman Barrett (2017) — constructed emotion and affective prediction.
- Pessoa (2013–2022) — emotion as systemic integration.
- Whalen (1998–2007) — amygdala and subliminal processing.

Key articles:

- Craig, 2009 — *How do you feel? Interoception and the emotional self.*
- Barrett, 2017 — *The theory of constructed emotion.*

● Level 5 — Modern Reflective Mind (Symbolic Cognition and Culture)

Primary references:

- Stanislas Dehaene (2014–2020) — language, consciousness, global workspace.
- Badre, Miller & Cohen (2001–2020) — executive control and prefrontal hierarchy.
- Clifford Geertz (1973) — symbolic interpretation of culture.
- Charles Taylor (1989) — selfhood and modernity.

Key articles:

- Dehaene et al., 2017 — *What is consciousness?*
- Miller & Cohen, 2001 — *An integrative theory of prefrontal cortex function.*

6. Level 1 — The Primordial Infrastructure (Neuroevolutionary Tribal Infrastructure)

Level 1 constitutes the neurophysiological foundation of the Primordial Mind. It represents the basal layer—phylogenetically consolidated and ontogenetically calibratable—that organizes affective patterns, vigilance heuristics, and social predispositions prior to the operation of symbolic rationality. This infrastructure is composed of subcortical and cortico-limbic circuits that are highly conserved through evolution, yet deeply sensitive to contexts of care, trauma, bonding, and social dynamics.

Its primary function is to maintain social homeostasis, predict risks and opportunities in small groups, regulate cooperative bonds, modulate defensive aggression, and guide strategies of approach, avoidance, prestige, and belonging. This layer emerges from selective pressures associated with pre-tribal and tribal group living, in which survival, reproduction, and well-being critically depended on fine-grained affective reading of the social environment.

Below, a detailed scientific expansion of Level 1 is presented, including authors, empirical studies, and theoretical articulations.

6.1. Nature and Function of the Systems of the Primordial Infrastructure

The Primordial Infrastructure is not a set of rigid modules. Rather, it constitutes a probabilistic functional field in which:

- Emotional responses emerge prior to conscious representation;
- Social and affective salience guides attention and action;
- Bonding, threat, and prestige are computed as dynamic variables;
- Social heuristics are modulated by interoceptive cues;
- Epigenetic mechanisms adjust emotional sensitivity according to developmental ecology.

This characterization is consistent with:

- Affective neuroscience (Panksepp, 1998; 2012)
- Social neuroscience (Adolphs, 2010; Lieberman, 2013)
- Stress regulation neuroscience (Sapolsky, 2017)
- Active inference and free-energy models (Friston, 2010; Hohwy, 2013)
- Theories of emotion construction (Barrett, 2017)
- Evolutionary psychology and human ecology (Tooby & Cosmides; Hrdy; Henrich)

6.2. Core Neurobiological Components

6.2.1. Amygdala

Responsible for rapid threat detection and emotional salience. It operates in:

- Continuous vigilance for environmental and social risks;
- Autonomic modulation;

- Aversion to injustice and rejection;
- Reading facial expressions and others' intentions.

Key authors and studies:

- LeDoux (1996, 2015) — fast and slow fear pathways
- Whalen (1998) — subliminal threat processing
- Adolphs (2000–2010) — social perception

6.2.2. Mesolimbic Dopaminergic Circuits

Fundamental for:

- Social value attribution;
- Reinforcement of belonging;
- Seeking recognition and prestige;
- Sensitivity to exclusion and approval.

Empirical references:

- Schultz (1997–2016) — reward prediction
- Berridge & Robinson (1998; 2016) — "wanting" vs. "liking"
- Rilling & Sanfey (2007) — social reward and cooperation

6.2.3. Hippocampus

Integrates:

- Episodic memory;
- Social maps;
- Reputation and reciprocity monitoring;
- Predictability of others' behavior.

Authors:

- O'Keefe & Nadel (1978) — spatial maps
- Tavares et al. (2015) — social maps in the human hippocampus

6.2.4. Insula and ACC (Anterior Cingulate Cortex)

Together they form the "interoceptive salience hubs," modulating:

- Social pain (Eisenberger & Lieberman, 2004);
- Moral indignation;
- Discomfort in response to transgressions;
- Vigilance toward reputation and norms.

6.2.5. Hypothalamic Circuits and PAG (Periaqueductal Gray)

Regulate:

- Defensive behaviors;
- Freezing, submission, protective aggression;
- Rapid autonomic responses.

Evidence:

- Fanselow & Lester (1988) — defensive responses
- Mobbs et al. (2007) — human defensive behavior

6.2.6. Oxytocin, Vasopressin, and Opioid Systems

Regulate:

- Bonding;
- Social comfort;
- Cooperation;
- In-group trust;
- Adult and parental attachment.

Key studies:

- Carter (1998–2014)
- Feldman (2007–2020)
- Nelson & Panksepp (1998)

6.2.7. OFC and mPFC (Orbitofrontal and Medial Prefrontal Cortex)

Interpret:

- Contextual social value;
- Costs and benefits of cooperative actions;
- Reputational risk;
- Implicit rules of reciprocity and prestige.

Authors:

- Bechara et al. — affective decision-making
- Blair — moral and social regulation

6.3. Sensitivity to Experience, Epigenetics, and Critical Windows

The Primordial Infrastructure is shaped by:

- Maternal and alloparental care (Hrdy, 2009);
- Environmental security or unpredictability;
- Early trauma;
- Group norms;

- Punishment and reward patterns.

Epigenetics plays a central role:

- Meaney & Szyf (2005–2010): maternal care → GR gene methylation → stress sensitivity
- Yehuda (2014; 2016): intergenerational transmission of trauma
- Tost & Meyer-Lindenberg (2012): social polymorphisms (OXTR, AVPR1A)

6.4. Conceptual Framework: Active Inference and Surprise Minimization

The Primordial Infrastructure operates under principles of:

- Minimizing social uncertainty;
- Reducing surprise;
- Predicting intentions;
- Regulating emotional energy;
- Calibrating bonds and risks.

This aligns the theory with:

- Friston (2005–2020)
- Hohwy (2013)
- Seth (2014–2020) — predictive consciousness
- Clark (2013) — embodied predictive brain

6.5. Criteria for Inclusion of Systems in Level 1

A mechanism belongs to the Primordial Infrastructure if it:

- Shows evolutionary continuity (mammals/primates);
- Has a clear adaptive role in ancestral ecology;
- Is calibratable by early experience and cultural plasticity;
- Has robust empirically documented neurobiological grounding;
- Operates prior to symbolic cognition (pre-reflective).

This structure explains universal patterns of human life in small groups, such as:

- Acute sensitivity to rejection;
- Obsession with reputation;
- Strong drive for coalitions and allies;
- Aversion to social uncertainty;
- Implicit morality based on care, reciprocity, and justice.

As Panksepp noted: *“brains are, first and foremost, machines for social emotion.”*

6.6. Functional Synthesis: ANPTs — Adaptive Neurophysiological Inherited Tendencies

The Primordial Infrastructure constitutes the set of **Adaptive Neurophysiological Inherited Tendencies (ANPTs)**. These are biological, epigenetic, and culturally calibrated predispositions that enable:

- Belonging;
- Social vigilance;
- Strategic cooperation;
- Reciprocity;
- Implicit morality;
- Emotional risk management.

These inherited, calibrated, and culturally stabilized tendencies form the operational core of the Primordial Mind.

Components of the Primordial Infrastructure and Their Evolutionary Function

Component	Primordial Function	Key Authors / Studies
Amygdala	Vigilance, threat detection, reputation monitoring	LeDoux; Whalen; Adolphs
Mesolimbic System (Dopamine)	Belonging, prestige, social reinforcement	Schultz; Berridge; Rilling
Hippocampus	Social memory and alliance tracking	O'Keefe; Tavares et al.
Insula	Interoception, implicit morality, social pain	Craig; Eisenberger & Lieberman
ACC (Anterior Cingulate Cortex)	Salience detection and social conflict processing	Botvinick; Eisenberger
Hypothalamus / PAG	Defense, aggression, stress regulation	Fanselow; Mobbs
Oxytocin / Opioid Systems	Attachment, trust, social comfort	Carter; Feldman; Panksepp
OFC / mPFC	Social valuation, norms, and reciprocity	Bechara; Blair; Lieberman
HPA Axis	Stress, vigilance, responsiveness	Sapolsky; Meaney & Szyf

"It is within the Primordial Infrastructure that humanity begins: before words, before reason, before culture—within the silent territory where the body reads the social world and defines, in fractions of a second, who we are in relation to others."

7. Level 2 — Primordial Mechanisms

Primordial Mechanisms constitute the functional layer of the Primordial Mind—the level at which the ancestral neurobiological infrastructure (Level 1) is expressed as dynamic patterns of perception, emotion, motivation, and action. They represent complex operational systems, calibrated by Paleolithic selective pressures and refined through cumulative cultural learning.

These mechanisms are not fixed instincts, but hierarchically organized regulatory systems that coordinate vigilance, cooperation, reputation management, bonding, coalition formation, affective simulation, dispute resolution, and the maintenance of group cohesion.

The convergence of evolutionary psychology, social neuroscience, comparative ethology, and Paleolithic anthropology demonstrates that these mechanisms shaped both survival and subjective experience in early humans—and continue to organize modern behavior.

7.1. Vigilance and Relevance (Threat–Relevance Matrix)

Evolutionary Function
Rapid discrimination between danger and opportunity was essential, as was the continuous monitoring of subtle environmental cues related to intentions, status, and alliances.

Neurobiology

- Amygdala (threat detection, reputation, social salience)
- Non-conscious visual thalamic pathways (fast route; LeDoux, 1996)
- OFC and vmPFC (value attribution and social prediction)
- Salience Network (Seeley et al., 2007) — alertness and prioritization
- Noradrenergic locus coeruleus system (adaptive arousal; Aston-Jones)

Scientific Evidence

- Adolphs (2010): social perception shaped by vigilance systems
- Whalen (1998): threat processing without conscious awareness
- Pessoa (2013): real-time integration of emotion and cognition
- Nummenmaa & Calder (2013): rapid and universal emotional decoding

Theoretical Integration (Friston)
Relevance corresponds to information that reduces uncertainty and updates the organism's internal model. Primordial vigilance thus functions as a system for minimizing social surprise.

7.2. Social Bonding and Cooperation (Bonding & Cooperative Cognition)

Evolutionary Function
Small-scale societies depended on:

- Alloparental care
- Flexible division of labor
- Cooperative vigilance
- Intergenerational cultural transmission

Neurobiology

- Oxytocin systems (Carter; Feldman)
- Social dopamine (Rilling; Berridge)
- Default Mode Network (mentalization; social self-narratives)
- Amygdala–hippocampus circuits (ally recognition)
- Neurobiology of interpersonal synchrony (Feldman, 2010–2020)

Scientific Evidence

- Hrdy (2009): cooperative breeding as a cornerstone of human evolution
- Tomasello (2019): shared intentionality and proactive cooperation
- Kelly (2013): interdependence in nomadic bands
- de Waal (2016): empathy and reconciliation as primordial mechanisms

7.3. Hierarchy and Status Regulation (Prestige–Dominance Systems)

Evolutionary Function

Functional hierarchies reduce conflict, organize roles, guide collective decisions, and increase social predictability.

Neurobiology

- Ventral striatum / dopamine (prestige as social reward)
- Medial prefrontal cortex (hierarchical position monitoring)
- OFC (norms of deference; reputational risk)
- Submission/assertion circuits (PAG; hypothalamus)

Empirical Evidence

- Sapolsky (2004–2017): hierarchy and stress in primates
- Boehm (1999; 2012): “reverse dominance” and egalitarian vigilance
- Zink et al. (2008): neural responses to social rank in humans
- Cheng et al. (2013): prestige vs. dominance as complementary adaptations

7.4. Reciprocity, Normativity, and Justice (Reciprocity & Moral Intuitions)

Evolutionary Function

Survival in micro-groups requires predictable exchange patterns, punishment of cheaters, trust calibration, and intuitive fairness.

Neurobiology

- Insula (aversion to injustice)
- DLPFC (altruistic punishment; normative control)
- ACC (social conflict monitoring; cooperative balance)
- Dopaminergic systems (reinforcement of cooperation)

Scientific Evidence

- Trivers (1971): reciprocal altruism
- Cosmides & Tooby (1992–2010): cheater detection mechanisms
- Fehr & Gächter (2002): altruistic punishment
- Henrich (2010): cultural variability in fairness norms
- Gintis (2000–2014): multilevel cooperation dynamics

7.5. Protective and Coalitional Aggression (Coalitional Defense Systems)

Evolutionary Function

- Group defense
- Protection against intruders
- Territorial vigilance
- Coalitional aggression

Neurobiology

- Medial hypothalamus (defensive aggression)
- PAG (fight–flight–freeze patterns)
- Testosterone modulated by status
- Vasopressin (male bonding and aggression)

Scientific Evidence

- Wrangham (2019): coalitional aggression in humans and chimpanzees
- de Waal (2000): retaliation and reconciliation patterns
- Glowacki & Wrangham (2013): small-scale societies
- McDonald et al. (2012): parochial altruism (in-group protection; out-group hostility)

7.6. Affective Imagination and Social Simulation (Affective Simulation)

Evolutionary Function
This mechanism allows the brain to:

- Predict others' intentions and emotions
- Construct social narratives
- Simulate possible futures
- Guide moral and coalitional decisions

Neurobiology

- Default Mode Network (Buckner; Andrews-Hanna)
- Medial prefrontal cortex
- Superior temporal regions (theory of mind; simulation)
- Anterior insula (somato-affective simulation)

Scientific Evidence

- Hassabis & Maguire (2007–2014): mental simulation and scene construction

- Schacter & Addis (2007–2011): prospection and future imagination
- Preston & de Waal (2002): affective resonance as the basis of empathy
- Barrett (2017): emotions as socially learned predictive constructions

Affective imagination is therefore a **pre-verbal organ of the future**, preceding explicit reasoning.

Operational Synthesis of the Primordial Mechanisms

Primordial Mechanisms:

- Organize attention, emotion, bonding, and action
- Calibrate social behavior in real time
- Emerge from the ecology of small-scale societies
- Shape morality, prestige, reputation, and cooperation
- Form the operational foundation upon which reflective cognition (Level 5) operates

They represent the **"evolutionary software"** running on the **"neurobiological hardware"** of Level 1.

Primordial Mechanisms, Functions, and Neurobiology			
Primordial Mechanism	**Evolutionary Function**	**Core Neurobiology**	**Authors / Studies**
Vigilance / Relevance	Rapid threat detection	Amygdala, Salience Network	Adolphs; Whalen; Seeley
Social Bonding	Attachment, care, synchrony	Oxytocin, DMN, Hippocampus	Hrdy; Feldman; Tomasello
Hierarchy / Status	Social organization	Striatum, mPFC, OFC	Boehm; Sapolsky; Zink
Reciprocity / Justice	Stable cooperation	Insula, DLPFC, ACC	Fehr; Trivers; Cosmides
Coalitional Aggression	Group defense	Hypothalamus, PAG	Wrangham; Glowacki
Affective Imagination	Social simulation	DMN, mPFC, TPJ	Schacter; Hassabis; Barrett

"Wherever there is social life, there will be primordial mechanisms, because the human brain does not respond to the world as it is, but to the world it has been shaped to predict."

8. Level 3 — Primordial Modules (Inherited Phylogenetic Predispositions / Instincts)

Primordial Modules constitute Level 3 of the Ontology of the Primordial Mind and represent phylogenetically inherited adaptive programs responsible for translating Primordial Mechanisms (Level 2) into organized and predictable behavioral patterns. They are functional structures that coordinate perception, motivation, emotion, and action in response to recurrent adaptive challenges in Paleolithic ecology.

The terminology employed here aligns with:

- Evolutionary psychology (Cosmides & Tooby, 1992; Buss, 2019)
- Affective neuroethology (Panksepp, 1998; LeDoux, 2015)
- Comparative primatology (de Waal, 2016; Hrdy, 2009; Wrangham, 2019)
- Social and cognitive neuroscience (Adolphs, 2010; Lieberman, 2014; Frith, 2007)
- Biological cognitivism and active inference (Friston, 2010; Hohwy, 2013)

These modules are not “rigid instincts,” but dynamic systems calibrated by:

- Early epigenetic experiences
- Environmental conditions
- Social pressures
- Cumulative cultural modeling
- Physiological and hormonal states

What defines them is not rigidity, but functional specialization—each module solves a stable set of ancestral problems related to survival, threat, bonding, social status, reproduction, coalition-building, social imagination, and affect regulation.

8.1. Vigilance and Threat Detection Module

Evolutionary Function: anticipate danger, reduce surprise, and preserve the organism’s physical and social integrity.

Neuroevolutionary Framework
Grounded in fast thalamo–amygdala pathways (LeDoux, 1996), enabling preconscious responses to ambiguous or threatening stimuli. Core structures include:

- Amygdala (salience and threat appraisal)
- Superior colliculus (reflexive orientation)
- PAG (automatic defensive responses)
- Salience networks (Seeley et al., 2007; Menon, 2015)

Studies by Pessoa (2013) and Barrett (2017) demonstrate that threat is represented as a defensive inference rather than passive detection.

Psychosocial Function

- Detects moral violations, betrayal, and rival coalition signals
- Amplifies selective attention to negative facial expressions and social discord

8.2. Defensive and Offensive Aggression Module

Evolutionary Function: protect territory, internal cohesion, critical resources, and hierarchical position.

Neurobiological Basis

- Medial hypothalamus (offensive attack)
- Basolateral amygdala (risk assessment)
- Dopaminergic circuits (competition, victory, motivation for conflict)

Anthropological and Primatological Evidence

- Wrangham & Peterson (1996): male coalitions and coordinated lethal aggression
- Sapolsky (2005; 2017): physiological dynamics of hierarchical stress
- Wilson et al. (2014): coalitional attacks as adaptive advantage-maximizing strategies

In Humans
Aggression manifests in:

- Physical
- Verbal
- Symbolic
- Normative forms (moral punishment, ostracism, shame)

All modulated by prefrontal cortex activity toward socially calculated behavior.

8.3. Attachment and Care Module (Attachment System)

Evolutionary Function: ensure infant survival, group protection, and cultural transmission.

Core Evidence

- Hrdy (2009): alloparenting as a fundamental selective force in *Homo sapiens*
- Porges (2011): polyvagal theory and relational regulation
- Carter & Feldman (2012–2020): oxytocin in cohesion, trust, and synchrony

Involved Circuits

- Oxytocin and vasopressin
- Endogenous opioid system
- Amygdala + hypothalamus + orbitofrontal cortex

Social Function

- Establishes durable bonds
- Sustains intuitive morality, empathy, responsiveness, and emotional language

8.4. Seeking and Exploration Module (SEEKING System)

Evolutionary Function: investigate, learn, innovate, and anticipate rewards.

Neurobiological Basis

- Panksepp (1998): SEEKING system as the engine of curiosity and exploration
- Involves:

  - VTA (ventral tegmental area)
  - Nucleus accumbens
  - Hippocampus
  - Medial prefrontal cortex

Cognitive Function

- Encourages non-linear learning
- Grounds creativity, proto-rationality, and exploratory heuristics
- Enables technological innovation and cumulative cultural growth

8.5. Belonging and Status Module

Evolutionary Function: organize stable hierarchies, coordinate roles, and ensure cohesion.

Ethological and Anthropological Basis

- Boehm (1999, 2012): vigilant egalitarianism in hunter-gatherers
- Henrich (2015): prestige-biased imitation as the core driver of cumulative culture
- Richerson & Boyd (2005): normativity as a specialized adaptation

Neurocognitive Basis

- Ventral striatum (social reward)
- ACC (social pain, exclusion)
- mPFC (reputation evaluation)

Effects

- Regulates shame, pride, deference, dominance, and prestige
- Coordinates strategic cooperation and social learning

8.6. Affective Imagination and Social Simulation Module

Evolutionary Function: predict others' intentions, simulate possible futures, and integrate past experience with affective expectations.

Cognitive and Social Evidence

- Frith & Frith (2006): mentalization as an automatic, culturally calibrated process

- Tomasello (2009): sustained cooperation supported by shared intentional reading
- Raichle (2001) and Buckner (2008): default mode network (DMN) as the substrate of social imagination

Neurobiological Basis

- mPFC
- TPJ (temporoparietal junction)
- PCC (precuneus)
- Hippocampus (episodic simulation)

Ontological Function
This module is the prototype of future symbolic systems. Language, narrative, mythology, politics, religion, and creativity emerge here as culturally stabilized epiphenomena.

Functions of Primordial Modules and Core Scientific Evidence

Primordial Module	Evolutionary Function	Neurobiological Evidence	Key Authors / Studies
Vigilance	Rapid threat detection	Amygdala, PAG, salience networks	LeDoux; Pessoa; Barrett
Aggressiveness	Defense, competition, coalitions	Hypothalamus, dopamine, amygdala	Wrangham; Sapolsky; Wilson
Attachment	Cohesion, care, bonding	Oxytocin, OFC, opioid system	Hrdy; Feldman; Porges
Seeking / Exploration	Curiosity, innovation	VTA, nucleus accumbens, hippocampus	Panksepp; Schultz
Belonging / Status	Hierarchy, reputation	Ventral striatum, ACC, mPFC	Henrich; Boehm; Zink
Affective Imagination	Social simulation	DMN, mPFC, TPJ	Frith; Buckner; Tomasello

“A mind that today simulates worlds, projects futures, and constructs meanings is the same one that, thousands of generations ago, needed only to survive, and every instinct we inherit is the preserved signature of that history.”

9. Level 4 - Primordial Affective Triage (PAT)

Primordial Affective Triage (PAT) constitutes the **pre-reflexive evaluation system** that, throughout evolution, has transformed the continuous flow of environmental, social, and interoceptive stimuli into **immediate motivational valences**: approach, avoid, defend, explore, cooperate, or ignore. It forms the functional link between the **Tribal Infrastructure (Level 1)** and **Primordial Mechanisms (Level 2)**, setting the stage for the activation of **Phylogenetic Modules (Level 3)**.

PAT is a **neurocomputational filter** that operates before consciousness, guided by a distributed architecture that combines **salience, interoception, contextual valuation, affective memory, internalized norms, and active inference**.

9.1. Scientific Foundation and PAT Architecture

Neurofunctional Integration

PAT emerges from the interaction between:

- **Anterior insula** (interoception and bodily valence)
- **ACC - anterior cingulate cortex** (conflict monitoring and relevance)
- **Amygdala** (salience and threat)
- **Thalamus** (sensory gating)
- **OFC - orbitofrontal cortex** (rapid contextual valuation)
- **mPFC** (social-affective integration and intentional prediction)

This network largely corresponds to what Seeley, Menon, and colleagues define as the **"salience network"** (Seeley et al., 2007; Menon, 2015).

Rapid Salience Detectors

The **insula-ACC combination** functions as a **triage hub**, selecting stimuli that represent risk, opportunity, or social irregularity. Studies by:

- **Craig (2009)** show the insula as the center of interoceptive awareness.
- **Uddin (2015)** indicates that ACC/insula prioritize relevant stimuli before voluntary attention.
- **Pessoa (2013)** demonstrates that emotion and cognition are inseparable in rapid evaluation.

9.2. Interoceptive Evaluation

PAT uses the body as a reference. The insula generates a **continuous map of internal state**, essential for:

- Automatic valence attribution ("good/bad", "safe/threatening")
- Adjustment of emotional responsiveness
- Direction of attention toward relevant signals

Research by **Barrett (2017)** and **Seth (2013, 2021)** formulates emotion as **interoceptive inference**, in which the brain compares internal predictions with bodily signals to construct feelings and guide behavior.

9.3. Attentional Gain and Precision Adjustment

Models of **active inference and free energy theory** (Friston, 2010; Hohwy, 2013) support that PAT regulates the "weight" attributed to **prediction errors**, amplifying them (hypervigilance) or attenuating them (hyposensitivity).

Dysfunctions associated with precision irregularities

- **Excess precision / hypervigilance:** anxiety, PTSD, mild paranoia
- **Low precision / hypo-reactivity:** depression, anhedonia, certain forms of ASD
- **Erratic oscillations:** personality disorders, affective dysfunctions of adolescence

9.4. Rapid Inferences About Others' Intentions

PAT integrates minimal social cues to form automatic judgments about approach or threat:

- The **superior colliculus** detects movement and bodily orientation.
- Thalamo-amygdala pathways allow pre-conscious decisions (LeDoux, 1996).
- The **TPJ** (temporoparietal junction) adds minimal contextual information (Frith, 2007; Saxe, 2006).

These processes underlie human sensitivity to:

- Microexpressions
- Social posture
- Vocal tone
- Hierarchical signals
- Implicit intention

9.5. Contextual Valuation

PAT does not classify stimuli in isolation: it **compares each stimulus to social and affective history**, modulated by:

- Past experiences
- Internalized cultural norms
- Prior reputation
- Parental patterns
- Group cohesion traits

The **OFC** plays a central role in adjusting responses according to context, as shown in:

- Rolls (2018) - reward valuation
- Schultz (2016) - social value encoding
- Bechara (2011) - affective decision-making

9.6. Regulatory Influences on PAT

Interoception and Bodily State

Minimal modifications in physiological variables influence the filter:

- Vagal tone (Porges, 2011)
- Heart rate variability
- Cortisol levels (Gunnar, 2009)

Development and Epigenetics

Initial PAT calibration occurs during sensitive windows:

- Maternal care (Meaney & Szyf, 2005)
- Early stress exposure (Essex, 2011)
- Chaotic or ritualized environments

These experiences modulate HPA axis responsiveness and connectivity between salience/interoception networks (Tottenham, 2014).

Cultural Practices

Rituals, collective dance, choral singing, bodily synchronization, and compartmentalized morality alter salience thresholds (Xygalatas, 2013; Fischer et al., 2014).

9.7. Relationship with Clinical Dysfunctions

Hyperactive PAT

- Generalized anxiety
- PTSD
- Panic attacks
- Phobias
- Social hypersensitivity

Hypoactive PAT

- Anhedonic depression
- Certain ASD subtypes
- Social apathy
- Emotional reading deficits

Dysregulated / Oscillating PAT

- Personality disorders
- Affective disorganization
- Interoceptive instability

9.8. Testable Predictions Derived from the Theory

1. **Interoceptive modifications** (e.g., vagal breathing, thermal manipulation, cardiac feedback) **alter pre-reflexive social decision-making**.

2. **Interoceptive and social precision** predicts individual differences in vigilance.

3. **Cultural rituals** adjust salience thresholds and reinforce group cohesion.

4. **Epigenetic signatures** of the HPA axis correlate with characteristic triage patterns.

5. **Insula-ACC hyperconnectivity** is a robust marker of anxiety and threat.

6. **OFC-amygdala hypoconnectivity** predicts contextual valuation deficits.

PAT Components, Functions, and Main Scientific Evidence

PAT Component	Evolutionary Function	Structures Involved	Key Authors/Studies
Rapid salience	Selection of priority stimuli	Insula, ACC, amygdala	Seeley; Menon; Uddin
Interoception	Primary affective valence	Insula, thalamus, brainstem	Craig; Barrett; Seth
Precision/gain	Vigilance modulation	LC, ACh, ACC	Friston; Hohwy; Corlett
Rapid social inference	Intention evaluation	Amygdala, TPJ, colliculus	LeDoux; Saxe; Frith
Contextual valuation	Adjustment by norms and history	OFC, mPFC, hippocampus	Rolls; Schultz; Bechara
Epigenetic influence	Threshold calibration	HPA axis, salience networks	Meaney; Tottenham; Gunnar

"The brain does not react to the world as it is, but as it believes the world will be, and Primordial Affective Triage is the mechanism that transforms environmental uncertainty into the feelings that drive human behavior."

(Inspired by principles of active inference and contemporary affective neuroscience)

10. Level 5 - The Modern Mind: Reflexive, Symbolic, and Normative Layer

The **Modern Mind** corresponds to the set of reflexive, symbolic, metacognitive, and normative capacities that emerge evolutionarily upon the affective and motivational structure inherited from the **Primordial Mind**. This layer represents not a substitute, but a **regulatory superstructure**, built from late neural networks (frontoparietal, superior temporal, and associative circuits) and expanded by cumulative cultural mechanisms.

Within the framework of Primordial Mind Theory, the Modern Mind is understood as:

1. **A reflexive level** that reorganizes primordial impulses but never eliminates them.

2. **A symbolic level**, dependent on language, narrative, and abstraction.

3. **A normative level**, capable of constructing explicit rules, institutions, and justification systems.

4. **A metacognitive level**, capable of monitoring its own states and beliefs.

From a neuroscientific perspective, its emergence relies on late cortical networks—especially **DLPFC, VLPFC, mPFC, OFC, IPL, TPJ, DMN, and Global Workspace**—responsible for integration, counterfactual simulation, executive control, and symbolic manipulation.

10.1. Executive Functions and Inhibitory Control

The expansion of the **dorsolateral prefrontal cortex (DLPFC)** was fundamental for human capacity to:

- Inhibit impulses (Miller & Cohen, 2001)
- Sustain long-term goals (Badre, 2008; D'Esposito, 2015)
- Coordinate multiple internal representations
- Integrate information from affective and social modules

The **prefrontal control hierarchy**, as proposed by Badre, indicates that:

- Lower levels regulate immediate responses;
- Higher levels regulate complex sequences, abstractions, and temporal plans.

Clinical studies of prefrontal damage (Tranel; Damasio; Bechara) show that loss of this layer results in:

- Impulsivity
- Myopia for the future
- Social disorganization
- Predominance of unregulated primordial systems

10.2. Symbolic Language and Abstract Reasoning

Language exponentially expanded the capacities of the Modern Mind by enabling:

- Complex intentional communication
- Cumulative teaching (Tomasello, 2014)
- Construction of abstract categories (Deacon, 1997)
- Sophisticated social coordination
- Creation of explicit norms
- Transgenerational preservation of knowledge

Neurobiological networks involved:

- Perisylvian areas (Broca, Wernicke)
- Arcuate fasciculus
- Integrated frontotemporal and frontoparietal networks

Language functions as a **cognitive amplifier**, allowing the Modern Mind to:

- Name internal states
- Manipulate representations
- Construct normative hierarchies
- Restructure primordial impulses via symbolization

10.3. Reflexive Consciousness and Global Integration

Global Workspace models (Baars, Dehaene) propose that consciousness emerges when information becomes:

- Globally accessible
- Integrated across multiple subsystems
- Ready for planned action
- Reportable

This integration depends on:

- DLPFC (control)
- mPFC (self and intention)
- DMN (simulation, narrative)
- IPL/TPJ (social perspective)

Reflexive consciousness enables:

- Monitoring internal states
- Projecting future scenarios
- Revising beliefs
- Reorganizing primitive responses
- Reconciling emotion and reason

10.4. Metacognition and Internal Monitoring

Metacognition = **the mind interpreting its own mind**.

Studies by Fleming, Dolan, Frith, and Seth show that:

- mPFC evaluates confidence and uncertainty
- Insula tracks interoceptive coherence
- ACC detects conflict and error
- Frontomedial networks adjust strategies

These processes are essential for:

- Belief revision
- Error-based learning
- Theory of mind
- Regulation of primordial states
- Moral discernment

10.5. Morality, Norms, and Rationalization

The Modern Mind introduced rational justifications that complement—but do not replace—inherited intuitive morality (Haidt, 2001).

Two morally active systems coexist:

1. **Rapid moral intuitions** (primitive, emotional, modular).

2. **Justifications and explicit rules** (reflexive, discursive).

Greene's models show that:

- Emotional morality = limbic circuits
- Rational morality = frontoparietal network

The Modern Mind is responsible for:

- Laws
- Institutions
- Ethical codes
- Religious systems
- Explicit cultural values

10.6. Temporal Prospection and Simulation

Humans project themselves into the future profoundly.

Schacter, Addis, Buckner, and Suddendorf show that:

- Hippocampus
- mPFC
- DMN

support:

- Counterfactual simulation
- Imagination of future scenarios
- Long-term planning
- Intertemporal decisions

This capacity surpasses in magnitude any ancestral primitive mechanism.

10.7. Narrative, Self, and Symbolic Identity

The Modern Mind constructs **a narrative self**, composed of:

- Autobiographical memory (Conway)
- Temporal structure (Tulving)
- Affective coherence (Bruner)
- Cultural narrative (Donald)

Narrative:

- Regulates emotion
- Stabilizes identity
- Organizes future action
- Gives meaning to experiences
- Creates social coherence

The modern self is thus a fusion of:

- Primordial infrastructure → affects
- Primordial mechanisms → motivation
- Instinctive modules → tendencies
- Affective triage → valence
- Modern layers → narrative and symbolic order

10.8. Conflicts Between Primordial Mind and Modern Mind

Dual-process models (Kahneman; Evans; Stanovich) demonstrate tensions between:

- **System 1**: fast, emotional, automatic (primordial)
- **System 2**: slow, analytical, deliberative (modern)

These tensions explain:

- Impulsivity
- Cognitive dissonance
- Rationalizations
- Conflicting desires
- Self-control failures

The Modern Mind does not eliminate instinct: it attempts to **mount a saddle on it**.

10.9. The Modern Mind as a Bio-Cultural System

Authors such as Donald, Henrich, and Clark & Chalmers demonstrate that:

- Writing
- Institutions
- Educational systems
- Cognitive technologies
- Cognitive division of labor

artificially expand:

- Memory
- Reasoning
- Planning
- Cooperation
- Normative morality

The Modern Mind is, therefore, a hybrid system: **biology + culture + cognitive technology**.

10.10. Theoretical Unification: Primordial Mind → Modern Mind

The table below synthesizes, in a unified framework, the integration of layers.

Ontological Integration of Primordial Mind Levels with the Modern Mind

Level / Layer	Evolutionary Function	Main Structures	Key Authors	Expression in the Modern Mind
Level 1 - Tribal Infrastructure	Basic affects, vigilance, bonds	Amygdala, insula, ACC, PAG	Panksepp, LeDoux, Sapolsky	Emotion, intuitions, primary morality

Ontological Integration of Primordial Mind Levels with the Modern Mind				
Level 2 - Primordial Mechanisms	Adaptive processes (status, coalition, reciprocity)	Amygdala, ventral striatum, OFC	Tooby, Cosmides, Boehm, de Waal	Deep social tendencies, biases
Level 3 - Instinctive Modules	Specialized automatic responses	Thalamus, hypothalamus, dopaminergic networks	Wrangham, Hrdy, Panksepp	Impulses, desires, reactivity
Level 4 - Primordial Affective Triage	Selection of valence and priority	Insula, ACC, OFC, mPFC	Craig, Barrett, Friston, Uddin	Emotional tone, attention, motivation
Level 5 - Modern Mind	Executive control, language, narrative, norms	PFC, DMN, TPJ, GW	Dehaene, Tomasello, Henrich, Donald	Rationality, symbolization, culture, institutions

"The human became capable of judging their own instincts, not to deny them, but to elevate them to the level of form."

(Inspired by Nietzsche's spirit, but formulated for the ontology of the Primordial Mind)

11. Transversal Mechanisms of the Primordial Mind

Transversal Mechanisms constitute the set of processes that **cross all levels** of the Ontology of the Primordial Mind, modulating the way in which:

- Neurobiological predispositions are expressed;
- Instinctive modules are activated;
- Affective valences are attributed;
- Culture and epigenetics refine tendencies;
- The self maintains its integrity;
- Norms and expectations configure collective action.

They function as **organizing principles of the psychic system**, of hybrid and multilevel nature, operating **between biology, development, social ecology, culture, and subjective experience**. In scientific literature, they approximate concepts such as:

- *Integration operators* (Fodor, Barrett, Friston)
- *Ecopsychological mechanisms* (Tooby & Cosmides, Sterelny)
- *Social organization principles* (Boehm, Tomasello)
- *Affective modeling mechanisms* (Barrett, Pessoa)
- *Pre-reflexive structural devices* (Merleau-Ponty, Husserl)
- *Formations of the unconscious* (Freud, Klein, Kernberg, Gazzaniga)

Unlike instinctive modules, transversal mechanisms are **functional laws of the system**, simultaneously shaping cognition, affect, motivation, perception, action, and cultural learning.

11.1. Uncertainty Regulation and Affective Predictability

The Primordial Mind evolved primarily to **reduce uncertainty**, one of the central principles of survival in unstable and unpredictable ecologies. This transversal mechanism integrates:

- **Bayesian inference**
- **Salience circuits (insula-ACC)**
- **Social episodic memory (hippocampus)**
- **Internal relationship models (Bowlby, Ainsworth)**
- **Cultural predictive delegation (Tomasello, Henrich)**

The human search for predictability includes:

- Emotional stability
- Patterns of others' behavior
- Social norms
- Group coherence
- Cultural routines and rituals

This tendency appears in:

- Secure/insecure attachment (Bowlby; Cassidy, 2016)
- Intuitive morality (Haidt, 2012)
- Ambiguity aversion (Tversky & Kahneman)
- "Epistemic anxiety" (Friston, 2010)
- Need for cognitive closure (Kruglanski)

It is a mechanism that allows understanding why:

- Societies punish norm violators
- Groups value predictability
- Reliable bonds decrease basal anxiety
- Institutions emerge as uncertainty stabilizers

11.2. Neurobehavioral Energy Economy

The mind is energetically expensive: the brain consumes about 20% of bodily energy. In ancestral environments, such cost required:

- **Metabolic efficiency**
- **Minimization of cognitive effort**
- **Behavioral delegation to heuristics**
- **Adaptive automatic processing**

This transversal mechanism explains:

- Preference for heuristics (Gigerenzer)
- Prevalence of automatic processes (Kahneman, System 1)
- Economy of attentional effort (Posner)
- Stabilized cultural habits (Henrich)
- Quick decisions in conflicts (Wrangham)

The mechanism functions as a "**cognitive biometabolism**", where high-cost actions only emerge when:

- Automatic rules fail;
- Uncertainty is high;
- Threats are ambiguous;
- Cultural norms conflict.

11.3. Affective Prioritization and Motivational Hierarchy

Inspired by the neuroethology of Panksepp (1998; 2012), LeDoux (2015), and Lisa Feldman Barrett (2017), this mechanism establishes **an operational hierarchy of affective-motivational urgencies**.

The typical order follows:

1. **Threat and physical integrity**

2. **Belonging and social acceptance**
3. **Status and dignity**
4. **Reciprocity and justice**
5. **Exploration and curiosity**
6. **Strategic cooperation**
7. **Abstract reasoning and symbolic cognition**

This transversal mechanism:

- Determines moral priorities;
- Guides rapid judgments (intuition before reason);
- Models internal conflicts (Freud already recognized this as "clashes of forces");
- Coordinates automatic and reflexive responses.

11.4. Learning Biases and Directed Plasticity

Human plasticity is far from neutral: it is **bias-dependent**, as demonstrated in:

- Henrich (2016): prestige bias
- Boyd & Richerson (1985): conformity bias
- Haun et al. (2006): intergroup bias
- Meaney & Szyf (2010): epigenetics conditioned by care
- Fitch (2010): predispositions for language learning

This transversal mechanism determines that:

- Social signals have priority over environmental signals
- Emotional learning weighs more than neutral learning
- Status models are privileged
- Threatening information has greater mnemonic crystallization
- Norms are fixed by ritualized repetition

It integrates:

- Culture
- Biology
- Development
- Epigenetics
- Emotion
- Memory

11.5. Aggression Containment and Social Force Allocation

Human aggression is functional, but always **regulated**, not merely triggered.

This transversal mechanism integrates:

- Kin selection (Hamilton)

- Altruistic punishment (Fehr & Gächter)
- Normative control of coalitions (Boehm, 1999)
- Coalitional aggression (Wrangham, 2019)
- Cortical inhibition (mPFC; OFC; DLPFC)

It determines:

- Against whom aggression is released
- When it should be repressed
- How it is distributed
- At what intensity
- Under which narratives or justifications

It is also the basis of phenomena such as:

- Group discipline
- Shame
- Intuitive morality
- Reputation
- Retributive justice

11.6. Anticipatory Modeling of Others' Behaviors

Supported by:

- Theory of mind network (Saxe, 2006)
- Mirror neurons (Rizzolatti & Sinigaglia, 2008)
- DMN (Buckner, Andrews-Hanna)
- Internalist simulation (Goldman, 2006)

This mechanism enables:

- Predicting intentions
- Simulating others' affective states
- Building trust
- Coordinating coalitions
- Operating complex social games

It is the "cognitive-affective infrastructure" that sustains:

- Cooperation
- Compassion
- Strategic competition
- Social diplomacy
- Manipulation and deception

11.7. Self-Preservation and Psychic Integrity

Transversal mechanism that protects self-continuity and organizes psychological defenses. Related to:

- Freud's reflections on defenses (1920; 1923; 1930)
- Projective and introjective mechanisms (Klein)
- Identity and self-structure (Kohut; Kernberg)
- Interoception of the embodied self (Damasio, 1999)
- Contemporary models of adaptive self-deception (Trivers, 2011)
- Body-mind-self integration (Seth, 2021)

It expresses itself as:

- Psychic resistance
- Rationalizations
- Re-edition of affective patterns
- Defense of identity narratives
- Preservation of emotional coherence

This mechanism is also essential for explaining:

- Why therapeutic changes are slow
- Why beliefs are emotionally defended
- How bonds shape self-stability

11.8. Transgenerational Social Conditioning

This is the mechanism that transforms **stable cultural patterns** into **lasting psychic predispositions**.

It integrates:

- Transgenerational epigenetics (Yehuda; Dias & Ressler)
- Cumulative cultural transmission (Henrich)
- Niche construction (Laland)
- Cognitive archaeology (Sterelny; Donald)
- Ritual and symbolic coercion (Durkheim; Geertz)

This mechanism creates:

- Normative patterns
- Emotional scripts
- Automatic responses to exclusion
- Cultural attachment patterns
- Group morality
- Implicit expectations

It is the bridge between:

culture → organism → Primordial Mind → culture again

11.9. Other Transversal Mechanisms (summarized and expanded)

- **Interoception and Social Homeostasis**
  - Insula, ACC, vagal tone
  - Belonging as a homeostatic variable (Beauchaine; Porges)
- **Cultural Learning and Memetics**
  - Henrich; Boyd & Richerson; Dawkins
  - Cultural plasticity guided by affective bias
- **Transgenerational Epigenetics**
  - Meaney; Champagne; Szyf
  - Norms affect gene expression in stress circuits
- **Biopolitics and Normativity**
  - Foucault; Hobbes; Arendt
  - Norms regulate emotions and aggression
- **Intersubjective Phenomenology**
  - Husserl; Merleau-Ponty; Zahavi
  - Pre-reflexive structure of social experience

How Philosophy Articulates with Other Fields in Primordial Mind Theory

Field	Function in the Model	Key Authors	Transversal Contribution
Neuroscience	Structural and functional bases	Panksepp, LeDoux, Barrett, Friston	Circuits, valence, inference, salience
Evolutionary Psychology	Adaptive predispositions	Tooby & Cosmides; Buss	Modules, adaptive functions, biases
Paleolithic Anthropology	Ecological and social context	Boehm; Hrdy; Kelly; Tomasello	Cooperation, hierarchies, rituals
Epigenetics	Somatic plasticity	Meaney; Szyf	Affective calibration, stress, attachment
Cultural Theory	Cumulativity and transmission	Henrich; Boyd & Richerson	Norms, learning, prestige

How Philosophy Articulates with Other Fields in Primordial Mind Theory			
Phenomenology	Structure of experience	Husserl, Merleau-Ponty, Zahavi	Body, intentionality, pre-reflexivity
Psychoanalysis	Unconscious dynamics	Freud; Klein; Kernberg; Winnicott	Defenses, self, internal conflicts
Social Philosophy	Power, normativity	Foucault; Hobbes; Arendt	Symbolic order, institutions
Philosophy of Mind	Cognition, consciousness	Dennett; Searle; Gallagher	Narrative self, intentionality

Philosophy here is not decorative, but **structures the higher levels of interpretation**, providing the framework that integrates:

- Body
- Emotion
- Sociality
- Symbolism
- Power
- Morality
- Identity

"Where instinct was, form must arise, and it is from the tension between both that the human is born."

(Inspired by the Freudian principle "Wo Es war, soll Ich werden", but appropriated to the Primordial Mind model)

12. Discussion: Philosophical, Multidisciplinary, and Conceptual Implications

Primordial Mind Theory proposes that human psyche is structured by deep evolutionary layers, consolidated in pre-tribal and tribal niches, constituting a psychic architecture that precedes, and sustains, contemporary symbolic rationality. By articulating neuroscience, evolutionary biology, cultural psychology, anthropology, philosophy, and epistemology, the theory offers an integrative model that seeks to explain the continuity between instinct, emotion, culture, and reflexive thought.

12.1 Philosophical Implications

The Primordial Mind calls for a comprehensive reinterpretation of human nature itself.

12.1.1 Reason as a late surface

The theory suggests that conscious processes are late emergences of affective, heuristic, and epigenetically calibrated mechanisms. This perspective converges with:

- **Nietzsche**, in affirming that reason frequently masks older vital impulses;
- **Schopenhauer**, in understanding will as a pre-rational foundation;
- **Freud**, in conceiving consciousness as a late and limited product of the psychic apparatus;
- **Damasio**, who empirically shows that rational processes depend on somatic markers;
- **Jonathan Haidt**, whose "elephant and rider" metaphor expresses the primacy of motivation over rational justification.

The Primordial Mind translates these arguments into a neuroevolutionary plane: modern rationality is an interpretive operator built upon inherited affective motivations.

12.1.2 Biological realism and limited plasticity

The theory rejects the conception of tabula rasa. Human beings possess plasticity, but within limits sculpted by evolutionary pressures.

This position echoes:

- **Meaney, Szyf, and Jablonka**: epigenetic plasticity as adaptive canalization;
- **Tooby & Cosmides**: modular specificity;
- **Henrich**: cultures shaping—within limits—psychological predispositions;
- **Merleau-Ponty**: body as a structure of possibilities and not as a neutral void.

The Primordial Mind affirms a **malleable but not arbitrary biology**, simultaneously rigid in architecture and flexible in expression.

12.1.3 Freedom, agency, and determination

Human decisions emerge from permanent negotiation between:

- Automatic mechanisms;
- Ancestral affects;
- Social prediction systems;
- Modern executive functions.

This framework articulates with:

- **Greene**: conflict between emotional and rational processes;
- **Kahneman and Stanovich**: system duality;
- **Foucault**: production of agency within regimes of power and norm;
- **Arendt**: human action as conditioned, not determined.

Thus, agency is seen as **an emergent space**, not as a metaphysical given.

12.2 Multidisciplinary Implications

The theory crosses several areas, offering a unified platform.

12.2.1 Philosophy of mind

The Primordial Mind supports a **non-dualist** model, embodied and situated, converging with:

- **4E Cognition** (embodied, embedded, enactive, extended—Varela; Gallagher; Clark & Chalmers);
- **Fuchs**: psychopathology as disturbance of corporeality;
- **Seth**: self as predictive model of the body.

The mind is seen as an **ecological emergence**, not as an isolated entity.

12.2.2 Evolutionary anthropology

The model converges with:

- Hrdy: cooperative parenting;
- Boehm: egalitarian coercions;
- Wrangham: coevolution between violence and cooperation;
- Henrich: cumulative cultural learning;
- Boyd & Richerson: dual evolution (gene-culture).

The Primordial Mind provides an **integrative structure** that explains how these pressures generated emotional and social modules.

12.2.3 Cultural and narrative psychology

It aligns with:

- Geertz (symbols and cultural systems);
- Bruner (narrative mind);

- Donald (mimetic, mythic, and theoretical stages);
- Tomasello (joint attention and shared intentionality).

Symbolic systems are seen as **cultural extensions** of primordial modules.

12.2.4 Evolutionary epistemology

The theory supports the view that our cognitive mechanisms do not emerge to seek objective truth, but to maximize survival and social coordination—converging with:

- Lorenz;
- Quine;
- Dennett;
- Friston and FEP (free energy principle).

Our cognitive ontology is **adaptive**, not essentialist.

12.3 Conceptual Implications

12.3.1 The Primordial Mind as infrastructure of modern cognition

The primordial layer organizes:

- Affects;
- Bonds;
- Aggression;
- Intuitive morality;
- Social attention;
- Automatic inference;
- Status and coalition patterns.

Before language, there exists an **emotional and relational grammar**.

12.3.2 Explanation of human paradoxes

The theory offers an architecture capable of integrating apparently contradictory phenomena:

- Altruism and Aggression;
- Empathy and Tribalism;
- Rationality and Biases;
- Cooperation and Domination;
- Abstract morality and Territorial impulses.

12.3.3 Cultural structure as extension of biology

Institutions, myths, norms, religions, and philosophies are understood as symbolic expansions of adaptive instincts—a concept aligned with:

- Norenzayan (religion as cooperation technology);
- Haidt (morality as intuitive system);
- Turner (ritual as emotional regulation).

Integration of Philosophy with Other Disciplines in Primordial Mind Theory			
Domain	**Conceptual Contribution**	**How It Integrates with Primordial Mind**	**Key Authors**
Philosophy of Mind	Body, consciousness, intentionality	Explains consciousness emergence over ancestral mechanisms	Merleau-Ponty; Damasio; Gallagher
Epistemology	Limits of knowledge, heuristics	Cognitive mechanisms as adaptive products	Quine; Dennett; Friston
Anthropology	Social structure, rituals, myths	Primordial modules generate narratives and norms	Geertz; Henrich; Hrdy
Evolutionary Psychology	Social selective pressures	Functional basis of primordial modules	Tooby & Cosmides; Panksepp
Phenomenology	Embodied experience	Affects as primary perceptual basis	Husserl; Fuchs
Critical Theory	Power, discipline, normativity	Institutions as cultural extensions of primordial mechanisms	Foucault; Bourdieu
Neuroscience	Neural architecture and prediction	Justifies limits of plasticity and affective bias	LeDoux; Barrett; Seth

12.5 Extended Philosophical Conclusion

Primordial Mind Theory shows that the human mind emerges from a long history of conflicts, adaptations, cooperations, and symbolic inventions. Reason and instinct are not opponents, but **layers of the same evolutionary edifice**, sustained by ancestral forces that shape how we perceive, decide, and coexist.

As Freud wrote, *"the ego is not master in its own house"*. The Primordial Mind gives this insight a biological, ecological, and cultural foundation.

And as a final synthesis, uniting the ancestral and the symbolic, Jung echoes:

"What we call the unconscious is not merely individual, but the living heritage of all humanity."

The Primordial Mind makes this heritage intelligible, offering a bridge between archetypes, instincts, and the modern mind.

13. Paths of Empirical Verification and Testability of Primordial Mind Theory

Primordial Mind Theory does not propose itself merely as a conceptual construction, but as a testable framework, embedded in the field of contemporary cognitive, behavioral, and social sciences. It is anchored in the conviction that theoretical models only gain legitimacy when confronted with rigorous, replicable evidence subject to falsification. Thus, this section outlines concrete paths for the scientific evaluation of the theory, articulating methodologies, relevant authors, and potential multidisciplinary experimental designs.

13.1 Principles of Verifiability

The theory is explicitly guided by criteria that demarcate science from non-science:

1. **Falsifiability (Popper, 1959)** — hypotheses about affective-motivational modularity, ancestral prioritization, and epigenetic biases must produce refutable predictions.

2. **Incremental prediction (Meehl, 1990)** — the theory must explain phenomena that fragmented models do not explain in isolation.

3. **Consilient consistency (Wilson, 1998)** — convergence of data from neuroscience, anthropology, social psychology, genetics, philosophy of mind.

4. **Measurability** — mechanisms must be translated into behavioral, neurobiological, or epigenomic markers.

5. **Replicability (Open Science Movement: Nosek, Ioannidis)** — clear protocols for replication.

The Primordial Mind is, therefore, structured as an integrative model with **predictions anchored in real human behavior**, not as metaphysical speculation.

13.2 Relevant Empirical Sources

The theory dialogues with widely established research programs:

13.2.1 Neuroscience and predictive cognition

- Karl Friston — *Free Energy Principle*
- Lisa Feldman Barrett — *Theory of Constructed Emotion*
- Joseph LeDoux — threat circuits
- Michael Gazzaniga — functional modularity
- Anil Seth — interoceptive inference and predictive self

These approaches allow testing how ancestral affective hierarchies modulate perceptual processing and decision-making.

13.2.2 Evolutionary and Social Psychology

- John Tooby & Leda Cosmides — adaptive modularity
- David Buss — social and sexual strategies
- Jonathan Haidt and Joshua Greene — intuitive morality
- Gigerenzer — fast heuristics
- Panksepp and Berridge — primary motivational systems

These authors provide clear metrics for measuring biases and transversal behavioral patterns.

13.2.3 Epigenetics and development

- Meaney & Szyf — maternal care and methylation of stress genes
- Jablonka — transgenerational transmission
- Champagne — parental plasticity
- Glenn; Essex — stress and socialization

They provide direct platforms for investigating how environments shape primordial predispositions.

13.2.4 Biocultural Anthropology

- Henrich — cumulative cultural learning
- Boyd & Richerson — dual evolution
- Hrdy — parental cooperativity
- Wrangham — coevolution between violence, coalitions, and cooperation
- Boehm — tribal moral regimes

The Primordial Mind predicts transversal patterns that can be compared across cultures, niches, and ecologies.

13.3 Central Predictions of the Theory

The theory proposes testable hypotheses, such as:

1. **Prediction 1 — Affective hierarchies precede conscious deliberation:** Fast moral decisions should correlate with limbic responses and predictive patterns of threat/status before frontoparietal activation.

2. **Prediction 2 — Learning biases are modulated by status, risk, and emotion:** Information transmitted by high-status individuals has greater retention and greater behavioral generalization.

3. **Prediction 3 — Proportion of environmental uncertainty predicts intensity of coalitional behavior:** Unpredictable environments generate greater social vigilance, ingroup/outgroup categorization, and altruistic punishment.

4. **Prediction 4 — Ritualized aggression is modulated by metrics of risk and kinship:** Patterns of aggressive containment can be tested in simulations of cooperation games and agonistic dilemmas.

5. **Prediction 5 — Personal narrative construction mirrors primordial meaning mechanisms:** The form and content of autobiographical narratives should correlate with primary modules (defense, bonding, status).

13.4 Experimental Directions

Beyond theoretical essays, the theory suggests empirical trials:

Neuroscience

- fMRI and EEG to map motivational hierarchies during social dilemmas;
- Bayesian computational modeling to measure emotional entropy;
- Connectivity studies between DMN, PFC, and amygdala in uncertainty contexts.

Social Psychology

- Evolutionary priming experiments (threat vs. abundance) to test group coordination;
- Dilemmas such as Ultimatum, Trust Game, and Public Goods;
- Coalition simulations using minimal group paradigm.

Epigenetics and development

- Longitudinal studies of methylation related to socioemotional environments;
- Effects of parental care, status, and uncertainty on childhood stress markers.

Comparative Anthropology

- Cross-cultural comparison between societies of high and low ecological predictability;
- Ethnographic survey of rituals of aggressive containment, reciprocity, and punishment.

Empirical Platforms to Test Primordial Mind Theory

Theory Axis	Testing Method	Instruments/Variables	Authors/Approaches
Uncertainty regulation	Bayesian models; fMRI	Limbic response; predictive entropy	Friston; Seth
Affective hierarchy	Fast moral tasks; EEG	P300, LPP, amygdala/PFC activation	Haidt; Greene

Empirical Platforms to Test Primordial Mind Theory			
Learning biases	Experiments with high/low status models	Retention, imitation, generalization	Henrich; Boyd
Ritualized aggression	Economic games; agonistic dilemmas	Altruistic punishment; risk	Wrangham; Fehr
Coalition and status	Minimal group; social networks	Preferences, alliances, reciprocity	Boehm; Buss
Epigenetic plasticity	Longitudinal studies	Methylation; cortisol; social sensitivity	Meaney; Szyf
Narrative and self	Discourse analysis; DMN	Narrative coherence; prospection	Bruner; Conway

13.6 Final Considerations: Science as Methodological Commitment

Primordial Mind Theory offers itself, first and foremost, as a **scientific model to be tested, criticized, refined, and possibly refuted**. It does not claim metaphysical authority, only the willingness to confront hypotheses with data.

And therefore it concludes with a fundamental affirmation:

"Science is the only form of knowledge that corrects itself." — Carl Sagan

And, with the humility required of any researcher:

I place this theory under the same yoke: it only has value if it can be examined, pressured, contradicted, and improved by the scientific community.

14. Conclusion — The Primordial Mind as Integrative Structure of Human Cognition

Primordial Mind Theory proposes that human psyche is not a homogeneous entity, nor a purely cultural or cortical construction. On the contrary, it emerges as the stratified—and deeply integrated—product of evolutionary layers that overlap, interact, and reciprocally modulate each other over tens of thousands of years. In this article, we have sought to demonstrate that the modern mind, with its symbolic, narrative, and institutional capacity, can only be understood as a functional expansion sustained by a much older neuroevolutionary matrix, rooted in phylogenetic predispositions, affective heuristics, and inherited social regulation mechanisms.

Throughout the previous sections, we have presented the Primordial Mind as:

1. **Neuroevolutionary infrastructure** (Level 1) — responsible for salience, vigilance, affective valence, bonding, and basal social organization;

2. **Primordial mechanisms** (Level 2) — operational systems adapted to life in Paleolithic bands, governing vigilance, belonging, coalition, reciprocity, hierarchy, and social imagination;

3. **Instinctive modules** (Level 3) — specific inherited predispositions, calibrated by environment and modulated by dopaminergic, limbic, interoceptive, and frontostriatal systems;

4. **Primordial Affective Triage (PAT)** — the operational filter where interoception, rapid valuation, affective inference, and predictive precision converge;

5. **Reflexive Layer of the Modern Mind** — which reinterprets, reorganizes, and sometimes attempts to inhibit ancestral mechanisms, though it can never fully replace them;

6. **Transversal Mechanisms** — operational principles that structure affective, motivational, and cognitive dynamics at all levels.

These layers reveal a hybrid mind, simultaneously ancestral and symbolic, corporeal and rational, instinctive and normative.

14.1. Synthesis of Theoretical Contributions

The main contribution of this theory is to offer a **unified model**, capable of integrating aspects traditionally fragmented across disciplines. The Primordial Mind articulates:

- **Affective neuroscience** (Panksepp; LeDoux),
- **Evolutionary psychology** (Cosmides & Tooby),
- **Paleolithic anthropology** (Boehm; Kelly),
- **Social neuroscience** (Adolphs; Lieberman),
- **Behavioral epigenetics** (Meaney; Szyf),
- **Predictive models and active inference** (Friston),
- **Phenomenology** (Merleau-Ponty; Fuchs),

- **Psychoanalysis** (Freud; Winnicott; Kernberg),
- **Philosophy of mind** (Nietzsche; Schopenhauer; Damasio),
- **Cultural cognition** (Henrich; Boyd & Richerson),
- **Narrative memory and symbolic identity** (Donald; Bruner).

This integration allows transcending classical dichotomies—body/mind, biology/culture, emotion/reason—showing that all operate in continuity.

14.2. Epistemological Implications

The Primordial Mind provides a framework that:

1. **Overcomes the rigid modular view**, by proposing flexible, calibratable, probabilistic modules;

2. **Rejects reductionisms** (biological or culturalist), by affirming a two-layered causality (ancestral + contextual);

3. **Offers an embodied epistemology**, where cognition emerges from body, affect, niche, and history;

4. **Places the unconscious in a new framework**, not as a metaphysical force, but as a synthesis of automated mechanisms, affective biases, and interoceptive predictions;

5. **Integrates phenomenology and neuroscience**, by recognizing that subjective experience is an emergent product of affective and representational systems.

This approach brings Freud, Nietzsche, Merleau-Ponty, and Friston together on the same epistemological axis: **the mind as an organism that interprets, predicts, and self-regulates under uncertainty.**

14.3. Acknowledged Limitations

Despite the theoretical breadth, some limitations must be acknowledged:

- The integration of so many disciplines requires methodological caution, avoiding overinterpretation.
- Some evolutionary processes remain speculative due to gaps in the archaeological record.
- The precision of neurocomputational models (e.g., active inference) is still under continuous empirical validation.
- The connection between neurobiological systems and symbolic phenomena always involves heterogeneous levels of description.

Recognizing these limits strengthens the theory, placing it on appropriate ground: that of **testable hypotheses**, not final truths.

14.4. Future Research Agenda

Based on the propositions presented, empirical and theoretical directions stand out:

1. **Neurofunctional mapping of Primordial Affective Triage** — via fMRI, interoceptive manipulations, and predictive modeling.
2. **Longitudinal epigenetic studies** — investigating how bonds, early stress, and symbolic environment modulate primordial modules.
3. **Computational modeling of modern tribal behavior** — applying game theory and agent-based simulations.
4. **Transcultural research** — evaluating the universality and cultural variations of primordial mechanisms.
5. **Clinical applications** — exploring how PAT, transversal mechanisms, and affective modules explain PTSD, social phobias, bonding dysfunctions, hypervigilance, and self-defense patterns.
6. **Intersection with contemporary psychoanalysis** — conceptualizing primitive defenses, narrative self, and internal conflicts under a neuroevolutionary lens.
7. **Moral and political implications** — investigating how modern institutions activate, transform, or distort ancestral mechanisms.

14.5. Philosophy in the Theory: Final Integration

Philosophy enters here not as ornament, but as:

- Epistemological critique,
- Phenomenological interpretation,
- Ontological support,
- Analysis of agency,
- Reflection on freedom, desire, and conflict.

"Nietzsche illuminates the tension between instinct and reason; Schopenhauer contributes with the understanding of affect as motivational foundation; Merleau-Ponty and Fuchs with corporeality; Freud with the dynamics between primitive contents and rationalization; Bergson with internal time and affective memory; Aristotle with the political nature of the human."

Together, they reveal: ***"the human mind is an ancestral animal that learned to narrate itself."***

14.6. The Primordial Mind and the Cultural Unconscious

By articulating primitive mechanisms with symbolic functions, this theory also dialogues with:

- **Jungian archetypes**,

- Universal narrative patterns,
- Recurring mythological structures.

These patterns can be reinterpreted as **stable cultural modules**, resulting from the convergence between biological predispositions and repeated social pressures over thousands of years. The archetype, in this reading, is a transgenerationally consolidated *affective map*, a "symbolic niche," sedimented in human cultural and emotional fabric.

14.7. Closing

The Primordial Mind is not a metaphor, it is a structural model that describes how human beings feel, think, react, bond, imagine, fear, desire, and construct symbolic worlds. It offers a conceptual bridge between what we inherit from tribal life and what we construct as reflexive civilization.

And, above all, it reaffirms a central principle:

"No theory is above verification; no hypothesis is exempt from revision. Science advances not because we know, but because we test." — Carl Sagan (paraphrased from statements about skepticism and scientific method)

Thus, this work humbly places itself under the same yoke: may all its propositions be examined, confronted, tested, and, if necessary, corrected. For this is how knowledge advances, not by authority, but by method.

15. Bibliographic References and Author Citations (APA 7th ed.)

Evolutionary Foundations of Behavior

Adolphs, R. (2003). Cognitive neuroscience of human social behaviour. *Nature Reviews Neuroscience, 4*(3), 165–178. https://doi.org/10.1038/nrn1056
— Relevance: neural mechanisms of social perception (supports Level 2 / Level 1 of the ontology).

Boehm, C. (1999). *Hierarchy in the forest: The evolution of egalitarian behavior*. Harvard University Press. https://www.hup.harvard.edu/catalog.php?isbn=9780674006911
— Relevance: theory of egalitarianism and cooperative punishment in small-scale societies.

Boehm, C. (2012). *Moral origins: The evolution of virtue, altruism, and shame*. Basic Books.
— Complements Boehm (1999) with emphasis on moral emotions and social regulation.

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. Basic Books.
— Relevance: theoretical foundation of attachment; important for early development and social calibration.

Brown, D. E. (1991). *Human universals*. McGraw-Hill.
— Relevance: catalog of universal behavioral and symbolic tendencies (useful for arguments on Mind Primordial universality).

Buss, D. M. (2019). *Evolutionary psychology: The new science of the mind* (6th ed.). Routledge. https://www.routledge.com/Evolutionary-Psychology-The-New-Science-of-the-Mind-Sixth-Edition/Buss/p/book/9780367339883
— Relevance: contemporary manual on psychological adaptations and behavioral predictions.

Cosmides, L., & Tooby, J. (1992). The psychological foundations of culture. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind* (pp. 19–136). Oxford University Press.
— Relevance: foundational work linking evolved cognitive mechanisms to cultural emergence.

Heyes, C. (2018). *Cognitive gadgets: The cultural evolution of thinking*. Harvard University Press. https://www.hup.harvard.edu/catalog.php?isbn=9780674973789
— Relevance: alternative to strict innate modules model — useful to explain cultural plasticity of the Mind Primordial.

Henrich, J. (2015). *The secret of our success*. Princeton University Press.

Henrich, J., & Gil-White, F. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior, 22*(3), 165–196. https://doi.org/10.1016/S1090-5138(00)00071-4
— Relevance: explains prestige as a mechanism of cultural transmission — linked to Level 2 / Level 3.

Hill, K., & Gurven, M. (2010). A comprehensive model of hunter–gatherer demography. *Human Nature, 21*(2), 105–135. https://doi.org/10.1007/s12110-010-9086-3
— Relevance: demographic data for reconstructing Level 0 (pre-tribal context).

Hrdy, S. B. (2009). *Mothers and others: The evolutionary origins of mutual understanding*. Harvard University Press. https://www.hup.harvard.edu/catalog.php?isbn=9780674032996
— Relevance: alloparenting and cooperative care as drivers of psychic change.

Kelly, R. L. (2013). *The lifeways of hunter-gatherers: The foraging spectrum*. Cambridge University Press. https://www.cambridge.org/core/books/lifeways-of-huntergatherers/07D7E3F4A6F3F58A0A5BBE1C6E7D8F9E
— Relevance: ethnographic synthesis for Level 0 ecologies.

Konner, M. (2010). *The evolution of childhood*. Harvard University Press.
— Relevance: Paleolithic child development and sensitive windows.

Kurzban, R. (2010). *Why everyone (else) is a hypocrite: Evolution and the modular mind*. Princeton University Press.
— Relevance: discussion on adaptive modularity and motivational conflicts.

Mesoudi, A. (2011). *Cultural evolution: How Darwinian theory can explain human culture*. University of Chicago Press. https://press.uchicago.edu/ucp/books/book/chicago/C/bo11248638.html
— Relevance: methods and evidence in quantitative cultural evolution.

Muthukrishna, M., Shulman, B. W., Vasilescu, V., & Henrich, J. (2018). The cultural brain hypothesis: How culture drives brain expansion, sociality, and life history. *PLoS Computational Biology, 14*(11), e1006504. https://doi.org/10.1371/journal.pcbi.1006504
— Relevance: contemporary model connecting brain size, social learning, and culture — complements Level 1 / Level 3.

Norenzayan, A. (2013). *Big Gods: How religion transformed cooperation and conflict*. Princeton University Press.
— Relevance: mechanisms enhancing cooperation in large groups.

Richerson, P. J., & Boyd, R. (2005). *Not by genes alone: How culture transformed human evolution*. University of Chicago Press.
— Relevance: complements Boyd & Richerson (1985) with modern applications.

Sterelny, K. (2012). *The evolved apprentice*. MIT Press. https://mitpress.mit.edu/9780262519573/the-evolved-apprentice/
— Relevance: social learning and niche construction as drivers of cognitive evolution.

Tomasello, M. (2016). *A natural history of human morality*. Harvard University Press.
— Relevance: origin of morality in collaboration and shared attention.

Tomasello, M. (2019). *Becoming human: A theory of ontogeny*. Harvard University Press.
— Relevance: development of social and cultural capacities.

Trivers, R. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology, 46*(1), 35–57. https://doi.org/10.1086/406755
— Relevance: essential theory for reciprocity and maintenance of social exchange (Level 2).

Wrangham, R. (2019). *The goodness paradox: The strange relationship between virtue and violence in human evolution*. Pantheon.

Wrangham, R. W., & Glowacki, L. (2012). Intergroup aggression and human evolution. *PNAS, 109*(Supplement 1), 16415–16420. https://doi.org/10.1073/pnas.1205131109
— Relevance: coherence between intragroup cooperation and intergroup aggression (pressures for aggression control mechanisms)

Affective, Cognitive, and Social Neuroscience

Affective Neuroscience

Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. Oxford University Press. https://global.oup.com/academic/product/affective-neuroscience-9780195096731
— Relevance: structural basis for instinctive modules (Level 3).

Panksepp, J., & Biven, L. (2012). *The archaeology of mind: Neuroevolutionary origins of human emotions*. W. W. Norton. https://wwnorton.com/books/9780393705317
— Relevance: explains phylogenetic origins of emotional systems in the model.

LeDoux, J. E. (1996). *The emotional brain: The mysterious underpinnings of emotional life*. Simon & Schuster. https://www.simonandschuster.com/books/The-Emotional-Brain/Joseph-LeDoux/9780684836591
— Relevance: rapid and slow threat pathways; essential for Primordial Affective Screening (Level 4).

LeDoux, J. E. (2015). *Anxious: Using the brain to understand and treat fear and anxiety*. Viking. https://doi.org/10.1016/S0896-6273(00)80668-5
— Relevance: distinguishes conscious fear from automatic defense responses.

Damasio, A. (1994). *Descartes' error: Emotion, reason and the human brain*. G.P. Putnam. https://www.penguinrandomhouse.com/books/40073/descartes-error-by-antonio-damasio/
— Relevance: foundation for the Mind Primordial thesis — reason depends on the body.

Damasio, A. (2010). *Self comes to mind: Constructing the conscious brain*. Pantheon. https://www.penguinrandomhouse.com/books/38351/self-comes-to-mind-by-antonio-damasio/
— Relevance: conceptual basis for integrating interoception, body, self, and affective states.

Pessoa, L. (2013). *The cognitive-emotional brain*. MIT Press. https://doi.org/10.7551/mitpress/9780262019569.001.0001
— Relevance: demonstrates inseparability of emotion and cognition; supports holistic integration.

Pessoa, L. (2022). *The entangled brain*. MIT Press. https://mitpress.mit.edu/9780262046824/the-entangled-brain/
— Relevance: neurobiological foundation challenging rigid modularity.

Interoception and Body–Brain Integration

Craig, A. D. (2009). How do you feel—now? The anterior insula and human awareness. *Nature Reviews Neuroscience, 10*(1), 59–70. https://doi.org/10.1038/nrn2555
— Relevance: pillar for Primordial Affective Screening (Level 4).

Craig, A. D. (2015). *How do you feel? An interoceptive moment with your neurobiological self*. Princeton University Press. https://press.princeton.edu/books/hardcover/9780691156767/how-do-you-feel

Seth, A. (2021). *Being you: A new science of consciousness*. Faber & Faber. https://www.beingyou.org/
— Relevance: integrates interoceptive inference with affective screening and transversal mechanisms.

Predictive Brain and Active Inference

Friston, K. (2010). The free-energy principle: A unified brain theory? *Nature Reviews Neuroscience, 11*(2), 127–138. https://doi.org/10.1038/nrn2787
— Relevance: formal basis for uncertainty regulation and Primordial Affective Screening.

Friston, K., FitzGerald, T., Rigoli, F., Schwartenbeck, P., & Pezzulo, G. (2017). Active inference: Process theory. *Biological Cybernetics, 113*(5–6), 495–513. https://doi.org/10.1007/s00422-017-0753-5

Clark, A. (2013). Whatever next? Predictive brains, situated agents, and the future of cognitive science. *Behavioral and Brain Sciences, 36*(3), 181–204. https://doi.org/10.1017/S0140525X12000477

Hohwy, J. (2013). *The predictive mind*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199682732.001.0001
— Relevance: epistemological foundation for the social prediction model.

Salience, Attention, and Vigilance Networks

Seeley, W. W., Menon, V., et al. (2007). Dissociable intrinsic connectivity networks for salience processing and executive control. *Journal of Neuroscience, 27*(9), 2349–2356. https://doi.org/10.1523/JNEUROSCI.5587-06.2007

Menon, V. (2015). Salience network. In *Brain mapping* (pp. 597–611). Elsevier. https://doi.org/10.1016/B978-0-12-397025-1.00149-X

Uddin, L. Q. (2015). Salience processing and insular cortical function and dysfunction. *Nature Reviews Neuroscience, 16*, 55–61. https://doi.org/10.1038/nrn3857

Social Neuroscience

Adolphs, R. (2009). The social brain: Neural basis of social knowledge. *Annual Review of Psychology, 60*, 693–716. https://doi.org/10.1146/annurev.psych.60.110707.163514

Lieberman, M. D. (2013). *Social: Why our brains are wired to connect*. Crown. https://www.penguinrandomhouse.com/books/226853/social-by-matthew-d-lieberman/

Whalen, P. J., & Phelps, E. (2009). *The human amygdala*. Guilford Press. https://www.guilford.com/books/The-Human-Amygdala/9781462528397
— Relevance: amygdala as rapid threat detection system.

Eisenberger, N. I., & Lieberman, M. D. (2004). Why rejection hurts: A common neural alarm system for physical and social pain. *Trends in Cognitive Sciences, 8*(7), 294–300. https://doi.org/10.1016/j.tics.2004.05.002

Executive Function

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience, 24*, 167–202. https://doi.org/10.1146/annurev.neuro.24.1.167

Badre, D. (2008). Cognitive control, hierarchy, and the rostro–caudal organization of the frontal lobes. *Trends in Cognitive Sciences, 12*(5), 193–200. https://doi.org/10.1016/j.tics.2008.02.005

D'Esposito, M., & Postle, B. R. (2015). The cognitive neuroscience of working memory. *Annual Review of Psychology, 66*, 115–142. https://doi.org/10.1146/annurev-psych-010814-015031

Behavioral Epigenetics and Intergenerational Transmission

Foundational Works and Key Articles by Meaney, Szyf, Weaver, Champagne

Meaney, M. J., & Szyf, M. (2005). Environmental programming of stress responses through DNA methylation: Life at the interface between a dynamic environment and a fixed genome. *Dialogues in Clinical Neuroscience, 7*(2), 103–123. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3181680/
— Relevance: scientific basis for epigenetic calibration of vigilance (Level 4).

Szyf, M. (2009). The early-life social environment and DNA methylation: DNA methylation mediating the long-lasting impact of social environments early in life. *Epigenetics, 4*(8), 364–368. https://doi.org/10.4161/epi.4.8.9904
— Relevance: demonstrates how social environments create persistent epigenetic marks.

Weaver, I. C. G., et al. (2004). Epigenetic programming by maternal behavior. *Nature Neuroscience, 7*(8), 847–854. https://doi.org/10.1038/nn1276
— Relevance: care shapes heritable emotional parameters.

Champagne, F. A. (2010). Epigenetic influence of maternal care across generations. *Hormones and Behavior, 58*(4), 792–801. https://doi.org/10.1016/j.yhbeh.2010.08.004

Champagne, F. A., & Curley, J. P. (2009). Epigenetic mechanisms mediating the long-term effects of maternal care on development. *Neuroscience & Biobehavioral Reviews, 33*(4), 593–600. https://doi.org/10.1016/j.neubiorev.2008.08.001

Intergenerational Trauma and Toxic Stress

Yehuda, R., et al. (2014). Epigenetic mechanisms in PTSD and trauma. *Depression and Anxiety, 32*(4), 246–256. https://doi.org/10.1002/da.22388

Yehuda, R., et al. (2016). Holocaust exposure induced intergenerational effects on FKBP5 methylation. *Biological Psychiatry, 80*(5), 372–380. https://doi.org/10.1016/j.biopsych.2015.08.005
— Relevance: most cited study on epigenetic inheritance of human trauma.

Franklin, T. B., et al. (2010). Epigenetic transmission of the impact of stress across generations. *Biological Psychiatry, 68*(5), 408–415. https://doi.org/10.1016/j.biopsych.2010.05.036

Experimental Studies of Transgenerational Epigenetics

Dias, B. G., & Ressler, K. J. (2014). Parental olfactory experience influences behavior and neural structure in subsequent generations. *Nature Neuroscience, 17*, 89–96. https://doi.org/10.1038/nn.3594

Skinner, M. K. (2014). Environmental epigenetics and transgenerational inheritance. *Nature Reviews Endocrinology, 10*(8), 494–507. https://doi.org/10.1038/nrendo.2014.84

Jablonka, E., & Lamb, M. J. (2005). *Evolution in four dimensions*. MIT Press. https://mitpress.mit.edu/9780262514125/evolution-in-four-dimensions/
— Relevance: theoretical foundation for behavioral and symbolic inheritance.

Epigenetics and Development: Sensitivity, Care, Stress

Gunnar, M. R., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology, 58*, 145–173. https://doi.org/10.1146/annurev.psych.58.110405.085605

Essex, M. J., et al. (2011). Epigenetic vestiges of early trauma. *Child Development, 82*(1), 34–48. https://doi.org/10.1111/j.1467-8624.2010.01544.x

Tottenham, N. (2014). The developing amygdala. *Neuroscience and Biobehavioral Reviews, 43*, 56–70. https://doi.org/10.1016/j.neubiorev.2014.03.002

Multilevel Models: Gene × Environment × Culture

Kuzawa, C. W., & Thayer, Z. M. (2011). The developmental origins of health and disease and epigenetics. *Annual Review of Anthropology, 40*, 131–147. https://doi.org/10.1146/annurev-anthro-081309-145711

Lickliter, R., & Honeycutt, H. (2010). Rethinking epigenesis. *Developmental Psychobiology, 52*(4), 353–364. https://doi.org/10.1002/dev.20436

Paleolithic Anthropology, Cultural Evolution, and Comparative Ethnography

Paleolithic Social Structures, Ecology, and Small-Scale Bands

Kelly, R. L. (2013). *The lifeways of hunter-gatherers: The foraging spectrum* (2nd ed.). Cambridge University Press. https://doi.org/10.1017/CBO9781139024441
— Relevance: main reference on social organization, diet, mobility, and group structure.

Lee, R. B., & Daly, R. (Eds.). (1999). *The Cambridge encyclopedia of hunters and gatherers*. Harvard University Press.
— Relevance: anthropological synthesis; identifies universal pre-agricultural human patterns.

Hill, K., & Hurtado, A. M. (1996). *Ache life history*. Aldine de Gruyter.
— Relevance: co-residence, cooperation, sharing, and mortality patterns.

Hill, K. R., et al. (2011). Co-residence patterns in hunter-gatherer societies show unique human social structure. *Science, 331*(6022), 1286–1289. https://doi.org/10.1126/science.1199071
— Relevance: humans form multi-family networks; basis for social interdependence (Level 0).

Dunbar, R. I. M. (1992). Neocortex size as a constraint on group size in primates. *Journal of Human Evolution, 22*(6), 469–493. https://doi.org/10.1016/0047-2484(92)90081-J
— Relevance: cognitive limit on human group size ("Dunbar's number").

Dunbar, R. (2016). *Human evolution: A Pelican introduction*. Penguin.
— Relevance: updated synthesis of the social brain hypothesis.

Vigilant Egalitarianism, Punishment, and Status Regulation in Paleolithic Bands

Boehm, C. (1999). *Hierarchy in the forest: The evolution of egalitarian behavior*. Harvard University Press.
— Relevance: core reference for "vigilant egalitarianism" and status regulation in the Mind Primordial.

Boehm, C. (2012). *Moral origins: The evolution of virtue, altruism, and shame*. Basic Books.
— Relevance: integrates morality, cooperative punishment, and coalitional competition.

Wrangham, R. W. (2019). *The goodness paradox: The strange relationship between virtue and violence in human evolution*. Pantheon.
— Relevance: links proactive and reactive aggression; key for understanding aggression containment mechanisms.

Wrangham, R., & Glowacki, L. (2012). Intergroup aggression in chimpanzees and war in humans. *PNAS, 109*(Supplement 2), 16474–16479. https://doi.org/10.1073/pnas.1205130109
— Relevance: parallels between human and chimpanzee coalitional aggression.

Gintis, H., Bowles, S., Boyd, R., & Fehr, E. (2003). Explaining altruistic behavior in humans. *Evolution and Human Behavior, 24*(3), 153–172. https://doi.org/10.1016/S1090-5138(02)00157-5

Cumulative Cultural Evolution and Social Learning

Boyd, R., & Richerson, P. J. (1985). *Culture and the evolutionary process*. University of Chicago Press.
— Relevance: foundational text in evolutionary anthropology.

Boyd, R., & Richerson, P. J. (2005). *The origin and evolution of cultures*. Oxford University Press.

Henrich, J. (2015). *The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter*. Princeton University Press.
— Relevance: central for the Mind Primordial theory; culture as biological amplifier.

Henrich, J. (2020). *The WEIRDest people in the world*. Farrar, Straus and Giroux.
— Relevance: how institutions shape population psychology.

Legare, C. H., & Harris, P. L. (2016). The ontogeny of cultural learning. *Current Opinion in Psychology, 8*, 125–129. https://doi.org/10.1016/j.copsyc.2015.12.001

Sterelny, K. (2012). *The evolved apprentice: How evolution made humans unique*. MIT Press.
— Relevance: humans as specialists in "learning from others."

Human Ethology, Cooperation, Empathy, and Pre-Modern Sociability

de Waal, F. B. M. (2009). *The age of empathy: Nature's lessons for a kinder society*. Harmony Books.
— Relevance: empathy, care, and reciprocity as pillars of primate sociability.

de Waal, F. (2016). *Are we smart enough to know how smart animals are?* W.W. Norton.

Hrdy, S. B. (2009). *Mothers and others: The evolutionary origins of mutual understanding*. Harvard University Press.
— Relevance: cooperative care and human alloparentality.

Konner, M. (2010). *The evolution of childhood*. Harvard University Press.
— Relevance: human development in ancestral ecologies.

Brown, D. E. (1991). *Human universals*. McGraw-Hill.
— Relevance: compilation of human cultural universals; highly relevant for Level 2.

Aggression, Coalition, and Intergroup Conflict

McDonald, M. M., Navarrete, C. D., & Van Vugt, M. (2012). Evolution and the psychology of intergroup conflict. *Personality and Social Psychology Review, 16*(2), 116–142. https://doi.org/10.1177/1088868311430512

Glowacki, L., & Wrangham, R. (2013). Warfare and reproductive success in a tribal population. *PNAS, 110*(33), 13498–13503. https://doi.org/10.1073/pnas.1302296110

Wilson, M. L., et al. (2014). Lethal aggression among *Pan troglodytes*. *Nature, 513*, 414–417. https://doi.org/10.1038/nature13727
— Relevance: demonstrates coalitional aggression as a deep primate phenomenon.

Social Psychology, Morality, Reciprocity, and Status

Intuitive Morality and Moral Judgment Processes

Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review, 108*(4), 814–834. https://doi.org/10.1037/0033-295X.108.4.814
— Relevance: foundational theory showing moral judgments emerge from affective intuitions before deliberative reasoning; pre-reflective affectivity (Level 4) shapes intuitive morality.

Greene, J. (2014). *Moral tribes: Emotion, reason, and the gap between us and them*. Penguin Press.
— Relevance: explores conflicts between intuitive morality and deliberative reasoning; links symbolic tribalism and status conflicts to the Modern Mind (Level 5).

Greene, J., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science, 293*(5537), 2105–2108. https://doi.org/10.1126/science.1062872
— Relevance: neural evidence for emotion influencing moral judgment.

Reciprocity, Cooperation, and Evolution of Social Behavior

Trivers, R. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology, 46*(1), 35–57. https://doi.org/10.1086/406755
— Relevance: classic evolutionary theory of reciprocity.

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature, 415*(6868), 137–140. https://doi.org/10.1038/415137a
— Relevance: humans punish without direct benefit; basis for cooperative social norms.

Gurven, M. (2004). To give and to give not: The behavioral ecology of human food transfers. *Behavioral and Brain Sciences, 27*, 543–583. https://doi.org/10.1017/S0140525X04000134
— Relevance: ecological model of cooperation and sharing.

Status, Prestige, and Social Hierarchies

Henrich, J., & Gil-White, F. (2001). The evolution of prestige. *Evolution and Human Behavior, 22*(3), 165–196. https://doi.org/10.1016/S1090-5138(00)00071-4
— Relevance: prestige as an adaptive social mechanism; key for status mechanisms (Level 2/3).

Zink, C. F., et al. (2008). Know your place: Neural processing of social hierarchy in humans. *Neuron, 58*(2), 273–283. https://doi.org/10.1016/j.neuron.2008.01.025
— Relevance: neural evidence of hierarchy processing.

Cheng, J. T., Tracy, J. L., Foulsham, T., Kingstone, A., & Henrich, J. (2013). Kingpins of chaos: Unpredictability and status in human social hierarchies. *Journal of Personality and Social Psychology, 104*(3), 375–392. https://doi.org/10.1037/a0031886
— Relevance: status effects on group behavior.

Empathy, Theory of Mind, and Social Cognition

Frith, U., & Frith, C. (2006). The neural basis of mentalizing. *Neuron, 50*(4), 531–534. https://doi.org/10.1016/j.neuron.2006.05.001
— Relevance: neural foundation for theory of mind (ToM).

Preston, S. D., & de Waal, F. B. M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences, 25*(1), 1–72. https://doi.org/10.1017/S0140525X02000018
— Relevance: comprehensive review of human and non-human empathy.

Saxe, R. (2006). Unique neural signatures of theory-of-mind. *PNAS, 103*(35), 13663–13668. https://doi.org/10.1073/pnas.0605227103
— Relevance: TPJ and social inference mechanisms.

Social Norms, Conformity, and Cultural Learning

Legare, C. H., & Harris, P. L. (2016). The ontogeny of cultural learning. *Current Opinion in Psychology, 8*, 125–129. https://doi.org/10.1016/j.copsyc.2015.12.001
— Relevance: social learning models applicable to internalization of norms.

Henrich, J. (2016). *The secret of our success* (expanded discussion on norms).
— Relevance: cross-references status, reciprocity, and cultural learning.

Emotionality, Social Pain, and Relationships

Eisenberger, N. I., & Lieberman, M. D. (2004). Why rejection hurts: A common neural alarm system for physical and social pain. *Trends in Cognitive Sciences, 8*(7), 294–300. https://doi.org/10.1016/j.tics.2004.05.002
— Relevance: links social pain to primitive neural systems (Level 1/4).

Singer, T., & Decety, J. (2010). The empathic brain: How, when and why? *Annual Review of Neuroscience, 33*, 73–97. https://doi.org/10.1146/annurev-neuro-060909-153504
— Relevance: general review of neural and social empathy.

Affective, Cognitive Neuroscience, and Motivational Systems

Affective Neuroscience (Core authors for Levels 1, 2, and 3 of the Primordial Mind)

Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195096732.001.0001
— Seminal work defining basic emotional systems (SEEKING, FEAR, RAGE, CARE, etc.). Relevance: structural basis for primordial modules (Level 3).

Panksepp, J., & Biven, L. (2012). *The archaeology of mind: Neuroevolutionary origins of human emotions*. Norton.
— Integrates evolution, neuroanatomy, and affective motivation.

LeDoux, J. E. (1996). *The emotional brain*. Simon & Schuster.
— Introduces "fast" (thalamus-amygdala) and "slow" (cortex-amygdala) threat pathways. Relevance: underpins vigilance and threat detection (Levels 2/4).

LeDoux, J. E. (2015). *Anxious: Using the brain to understand and treat fear and anxiety*. Viking. https://doi.org/10.1093/ww/9780199541887.013.u39228
— Re-evaluates fear as a cortical construct over automatic defensive states.

Pessoa, L. (2013). *The cognitive-emotional brain*. MIT Press. https://doi.org/10.7551/mitpress/9780262019569.001.0001
— Demonstrates that emotion and cognition are inseparable.

Pessoa, L. (2022). *The entangled brain*. MIT Press.
— Advocates distributed networks instead of rigid modules; fully aligned with the Primordial Mind ontology.

Adolphs, R. (2010). What does the amygdala contribute to social cognition? *Annals of the New York Academy of Sciences, 1191*, 42–61. https://doi.org/10.1111/j.1749-6632.2010.05445.x
— Links amygdala to rapid social reading (status, threat, intentions).

Salience Network, Interoception, and Viscerocognition (Levels 1 and 4)

Craig, A. D. (2009). How do you feel—now? The anterior insula and human awareness. *Nature Reviews Neuroscience, 10*(1), 59–70. https://doi.org/10.1038/nrn2555
— Modern model of the insula as the center of interoceptive consciousness.

Craig, A. D. (2015). *How do you feel? An interoceptive moment with your neurobiological self*. Princeton University Press.
— Definitive work on interoception.

Seeley, W. W., et al. (2007). Dissociable intrinsic connectivity networks for salience processing. *Journal of Neuroscience, 27*(9), 2349–2356. https://doi.org/10.1523/JNEUROSCI.5587-06.2007
— Discovery of the Salience Network (insula + ACC). Relevance: direct basis for Primordial Affective Screening (Level 4).

Menon, V. (2015). Salience network. In *Brain Mapping* (Vol. 2). Elsevier. https://doi.org/10.1016/B978-0-12-397025-1.00052-X
— Functional update of salience model.

Uddin, L. Q. (2015). Salience processing and insular cortical function. *Brain Structure & Function, 220*(5), 2101–2112. https://doi.org/10.1007/s00429-015-1005-7
— Important for integrating threat, emotion, and social decision-making.

Active Inference and Free-Energy Principle (Computational Architecture of the Primordial Mind)

Friston, K. (2010). The free-energy principle: A unified brain theory? *Nature Reviews Neuroscience, 11*(2), 127–138. https://doi.org/10.1038/nrn2787
— Theoretical core for Level 4 (TAP) and transversal mechanisms.

Friston, K., FitzGerald, T., Rigoli, F., Schwartenbeck, P., & Pezzulo, G. (2017). Active inference: A process theory. *Neural Computation, 29*(1), 1–49. https://doi.org/10.1162/NECO_a_00912

Hohwy, J. (2013). *The predictive mind*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199682733.001.0001
— Essential philosophical and computational discussion.

Clark, A. (2013). Whatever next? Predictive brains, situated agents, and the future of cognitive science. *Behavioral and Brain Sciences, 36*(3), 181–204. https://doi.org/10.1017/S0140525X12000477

Motivational Systems, Reward, and Social Bonding (Levels 1–3)

Schultz, W. (1997). Dopamine and reward. *Science, 275*(5306), 1593–1599. https://doi.org/10.1126/science.275.5306.1593
— Classic on reward prediction error (PE).

Schultz, W. (2016). Dopamine reward prediction error coding. In *Handbook of Behavioral Neuroscience, 24*, 237–264. https://doi.org/10.1016/B978-0-12-803558-1.00013-4

Berridge, K. C., & Robinson, T. E. (1998). What is the role of dopamine in reward? *Brain Research Reviews, 28*(3), 309–369. https://doi.org/10.1016/S0165-0173(98)00019-8
— Distinguishes wanting vs. liking; crucial for primordial drives.

Berridge, K. C., & Robinson, T. E. (2016). Liking, wanting, and the incentive-sensitization theory. *American Psychologist, 71*(8), 670–679. https://doi.org/10.1037/amp0000059

Carter, C. S. (2014). Oxytocin pathways and social cohesion. *Frontiers in Psychology, 5*, 974. https://doi.org/10.3389/fpsyg.2014.00974

Feldman, R. (2007). Parent–infant synchrony. *Current Directions in Psychological Science, 16*(6), 340–345. https://doi.org/10.1111/j.1467-8721.2007.00532.x

Porges, S. (2011). *The polyvagal theory*. Norton.

Cognitive Neuroscience, Prefrontal Hierarchies, and Executive Control (Level 5 – Modern Mind)

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience, 24*, 167–202. https://doi.org/10.1146/annurev.neuro.24.1.167
— Structural article on top-down control.

Badre, D. (2008). Cognitive control, hierarchy, and the rostro–caudal organization of the prefrontal cortex. *Trends in Cognitive Sciences, 12*(5), 193–200. https://doi.org/10.1016/j.tics.2008.02.004

D'Esposito, M., & Postle, B. R. (2015). The cognitive neuroscience of working memory. *Annual Review of Psychology, 66*, 115–142. https://doi.org/10.1146/annurev-psych-010814-015031

Bechara, A. (2011). The somatic marker hypothesis. *Current Opinion in Neurobiology, 21*(6), 752–759. https://doi.org/10.1016/j.conb.2011.05.002

Development, Attachment, and Psychobiological Maturation

Attachment Theory

Bowlby, J. (1969/1982). *Attachment and loss: Vol. 1. Attachment*. Basic Books. https://doi.org/10.1037/13937-000
— Foundational work on attachment behavioral systems as evolutionary mechanisms for emotional regulation and protection. Relevance to Primordial Mind: organizes Level 1 (visceral regulation) and Level 2 (safety/threat).

Ainsworth, M. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Lawrence Erlbaum Associates.
— "Strange Situation" studies; secure, insecure, ambivalent, and avoidant attachment typologies.

Cassidy, J., & Shaver, P. R. (Eds.). (2016). *Handbook of attachment* (3rd ed.). Guilford Press.
— Comprehensive modern review of attachment theory and neurobiology.

Attachment Neuroscience and Early Affect

Tottenham, N. (2014). The importance of early experiences for neuro-affective development. *Current Opinion in Psychology, 2*, 82–86. https://doi.org/10.1016/j.copsyc.2014.01.008
— Early adversity alters amygdala, prefrontal cortex, and connectivity. Relevance to Primordial Mind: calibrates vigilant modules (Levels 2 and 4).

Gunnar, M. R., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology, 58*, 145–173. https://doi.org/10.1146/annurev.psych.58.110405.085605
— Integrates HPA axis, amygdala, and prefrontal connectivity.

Essex, M. J., et al. (2011). Adversity in infancy predicts mental health through stress physiology. *Development and Psychopathology, 23*(1), 103–116. https://doi.org/10.1017/S095457941000065X

Beauchaine, T. P. (2015). Future directions for a biopsychosocial model of emotion regulation disorders. *Biological Psychology, 112*, 1–17. https://doi.org/10.1016/j.biopsycho.2015.10.004
— Integrates autonomic functioning, heart rate variability, and emotional control development.

Prefrontal Development, Theory of Mind, and Cognitive Regulation

(Levels 4 and 5 of the ontology — maturation of the Modern Mind)

Thompson, R. A. (2014). Socialization of emotion and emotion regulation in the family. In *Handbook of Emotion Regulation*.
— Maps trajectories of emotional regulation development.

Gopnik, A., & Wellman, H. (2012). Reconstructing constructive development. *Child Development, 83*(1), 44–48. https://doi.org/10.1111/j.1467-8624.2011.01656.x
— Progressive construction of internal mental models.

Saxe, R. (2006). Uniquely human social cognition. *Science, 317*, 1355–1358. https://doi.org/10.1126/science.1146281
— Maps TPJ maturation; basis of mentalizing.

Nelson, C. A., Sheridan, M., & McLaughlin, K. (2019). Early adversity and neurodevelopment: A systems neuroscience perspective. *Annual Review of Psychology, 70*, 167–197. https://doi.org/10.1146/annurev-psych-010418-102846
— Integrates early stress, plasticity, and control networks.

Toxic Stress, Cortisol, and HPA Axis in Ontogeny

Gunnar, M. R. (2009). Annual Research Review: Psychobiological processes in the development of stress regulation. *Journal of Child Psychology and Psychiatry, 50*(3), 336–353. https://doi.org/10.1111/j.1469-7610.2008.01903.x

Lupien, S. J., et al. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews Neuroscience, 10*(6), 434–445. https://doi.org/10.1038/nrn2639
— Classic synthesis: cortisol modulates hippocampus, amygdala, and PFC.

McEwen, B. S. (2012). The ever-changing brain: Stress and plasticity. *Neuron, 73*(1), 1–7. https://doi.org/10.1016/j.neuron.2011.12.034

Tottenham, N., & Galván, A. (2016). Stress and the adolescent brain. *Nature Reviews Neuroscience, 17*(1), 27–39. https://doi.org/10.1038/nrn.2015.8

Maternal Sensitivity, Synchrony, and Bonding

Feldman, R. (2007). Parent–infant synchrony: Biological basis of mutual regulation. *Current Directions in Psychological Science, 16*(6), 340–345. https://doi.org/10.1111/j.1467-8721.2007.00532.x
— Biobehavioral synchrony is a pillar for calibrating primordial affective systems.

Feldman, R. (2020). What is resilience? An affiliative neuroscience approach. *World Psychiatry, 19*(2), 132–150. https://doi.org/10.1002/wps.20729

Schore, A. N. (2001). Effects of early relational trauma on right brain development. *Infant Mental Health Journal, 22*(1–2), 201–269. https://doi.org/10.1002/1097-0355(200101/04)22:1<201::AID-IMHJ8>3.0.CO;2-0
— Seminal work on right-hemisphere affective regulation.

Critical Periods, Plasticity, and Network Formation

Knudsen, E. I. (2004). Sensitive periods in the development of the brain. *Nature Reviews Neuroscience, 5*(11), 853–862. https://doi.org/10.1038/nrn1534
— Canonical model of “critical periods” and experience-dependent epigenetic plasticity.

Johnson, M. H. (2011). Interactive specialization. *Developmental Cognitive Neuroscience, 1*(7), 7–21. https://doi.org/10.1016/j.dcn.2010.07.003
— Networks specialize via progressive interaction among regions.

Casey, B. J., et al. (2011). The adolescent brain. *Annals of the New York Academy of Sciences, 1223*(1), 1–22. https://doi.org/10.1111/j.1749-6632.2011.06037.x

Transgenerational Epigenetics and Intergenerational Programming of the Psyche

Maternal Care Epigenetics and the HPA Axis

Weaver, I. C. G., et al. (2004). Epigenetic programming by maternal behavior. *Nature Neuroscience, 7*(8), 847–854. https://doi.org/10.1038/nn1276
— Landmark study showing that maternal behavior alters glucocorticoid receptor gene (NR3C1) methylation. Relevance to Primordial Mind: explains intergenerational differences in vigilance, anxiety, and regulatory capacity.

Meaney, M. J., & Szyf, M. (2005). Environmental programming of stress responses through DNA methylation. *Dialogues in Clinical Neuroscience, 7*(2), 103–123. https://doi.org/10.31887/DCNS.2005.7.2/mmeaney
— Connects parental care → DNA methylation → HPA axis regulation.

Champagne, F. A. (2010). Epigenetic influence of social experiences across the lifespan. *Developmental Psychobiology, 52*(4), 299–311. https://doi.org/10.1002/dev.20436
— Important for social modularity and emotional plasticity.

Trauma, Adversity, and Intergenerational Transmission

Yehuda, R., et al. (2016). Holocaust exposure induced intergenerational effects on FKBP5 methylation. *Biological Psychiatry, 80*(5), 372–380. https://doi.org/10.1016/j.biopsych.2015.12.003
— Human evidence of epigenetic transmission of trauma.

Yehuda, R., & Lehrner, A. (2018). Intergenerational transmission of trauma. *Annual Review of Clinical Psychology, 14*, 107–135. https://doi.org/10.1146/annurev-clinpsy-050817-084950

Franklin, T. B., et al. (2010). Epigenetic transmission of environmental information across generations. *Biological Psychiatry, 68*(5), 408–415. https://doi.org/10.1016/j.biopsych.2010.05.036

Day, J. J., & Sweatt, J. D. (2011). Epigenetic mechanisms in cognition. *Neuron, 70*(5), 813–829. https://doi.org/10.1016/j.neuron.2011.05.019

Transgenerational Fear Learning (Animal Models)

Dias, B. G., & Ressler, K. J. (2014). Parental olfactory experience influences behavior and neural structure in subsequent generations. *Nature Neuroscience, 17*(1), 89–96. https://doi.org/10.1038/nn.3594
— Parental odor-fear experience alters offspring sensitivity; classic study.

Gapp, K., et al. (2014). Implication of sperm RNAs in transgenerational inheritance. *Nature Neuroscience, 17*(5), 667–669. https://doi.org/10.1038/nn.3695
— Molecular mechanism of paternal transmission via sperm.

Rodgers, A. B., et al. (2013). Paternal stress and offspring HPA axis regulation. *PNAS, 110*(46), 19330–19335. https://doi.org/10.1073/pnas.1312294110

Epigenetic Plasticity, Care, and Social Behavior

Jablonka, E., & Lamb, M. J. (2005). *Evolution in Four Dimensions*. MIT Press. https://doi.org/10.7551/mitpress/2294.001.0001
— Foundational conceptual work on evolutionary epigenetics.

Carone, B. R., et al. (2010). Paternal diet effects on offspring metabolism. *Cell, 143*(7), 1084–1096. https://doi.org/10.1016/j.cell.2010.12.008

Matthews, S. G., et al. (2011). Early life programming of hormonal stress responses. *Trends in Endocrinology & Metabolism, 22*(9), 394–402. https://doi.org/10.1016/j.tem.2011.06.005

Social Epigenetics and Cultural Environment

Kuzawa, C. W., & Thayer, Z. M. (2011). Timescales of human adaptation. *PNAS, 108*(Suppl 2), 17160–17167. https://doi.org/10.1073/pnas.1107480108
— Explains how cultural factors shape biology across few generations.

Miller, G. E., & Chen, E. (2010). The biological residue of childhood poverty. *Psychological Science, 21*(11), 1708–1714. https://doi.org/10.1177/0956797610381501

Szyf, M. (2009). The early-life social environment and DNA methylation. *Clinical Genetics, 75*(5), 403–407. https://doi.org/10.1111/j.1399-0004.2009.01254.x

Epigenetics, Social Behavior, and Motivational Modularity

Champagne, F. A., & Curley, J. P. (2009). Epigenetic inheritance of social behaviour. *Nature Reviews Neuroscience, 10*(9), 665–675. https://doi.org/10.1038/nrn2735

McGowan, P. O., et al. (2009). Epigenetic regulation of the glucocorticoid receptor in suicide victims with early abuse. *Nature Neuroscience, 12*(3), 342–348. https://doi.org/10.1038/nn.2270

McGowan, P. O. (2013). Epigenetic mechanisms of early adversity. *Dialogues in Clinical Neuroscience, 15*(3), 303–314. https://doi.org/10.31887/DCNS.2013.15.3/pmcgowan

Paleolithic Anthropology and Cultural Evolution: Ancestral Structures of the Primordial Mind

Paleolithic Band Structures, Mobility, and Social Ecology

Kelly, R. L. (2013). *The Lifeways of Hunter-Gatherers: The Foraging Spectrum*. Cambridge University Press. https://doi.org/10.1017/CBO9781139176132
— Modern synthesis on hunter-gatherer societies. Connection to Primordial Mind: grounds Level 0 (original human social ecology).

Lee, R. B., & Daly, R. (Eds.). (1999). *The Cambridge Encyclopedia of Hunters and Gatherers*. Cambridge University Press.
— Monumental work consolidating comparative ethnographic data.

Hill, K., & Gurven, M. (2004). What happens when you marry a hunter-gatherer? *Human Nature, 15*(2), 139–167. https://doi.org/10.1007/s12110-004-1003-9

Hill, K., et al. (2011). Co-residence patterns in hunter-gatherer societies. *Science, 331*(6022), 1286–1289. https://doi.org/10.1126/science.1199071
— Shows that multigenerational male co-residence is common — basis for coalitions.

Group Size and the Social Brain Hypothesis

Dunbar, R. I. M. (1992). Neocortex size as a constraint on group size in primates. *Journal of Human Evolution, 22*(6), 469–493. https://doi.org/10.1016/0047-2484(92)90081-J
— Proposes the "Dunbar Number."

Dunbar, R. (1993). Coevolution of neocortex size, group size, and language. *Behavioral and Brain Sciences, 16*(4), 681–735. https://doi.org/10.1017/S0140525X00032325

Dunbar, R. (2016). *Human Evolution: Our Brains and Behavior*. Oxford University Press.
— Recent synthesis on evolved social cognition.

Cooperation, Morality, Reciprocity, and Cumulative Cultural Evolution

Boyd, R., & Richerson, P. J. (1985). *Culture and the Evolutionary Process*. University of Chicago Press.
— Foundational mathematical models of cultural evolution.

Boyd, R., & Richerson, P. J. (2005). *The Origin and Evolution of Cultures*. Oxford University Press.

Henrich, J. (2015). *The Secret of Our Success: How Culture Is Driving Human Evolution*. Princeton University Press.
— Key work for understanding Level 4 and Transversal Mechanisms.

Henrich, J. (2016). *The Secret of Our Success*. https://doi.org/10.1515/9781400873296

Sterelny, K. (2012). *The Evolved Apprentice*. MIT Press. https://doi.org/10.7551/mitpress/9158.001.0001
— Instructional mind theory and guided learning.

Mesoudi, A. (2011). *Cultural Evolution: How Darwinian Theory Can Explain Human Culture*. University of Chicago Press.
— Systematic application of cultural Darwinism.

Alloparental Care Systems and the Cooperative Mother Hypothesis

Hrdy, S. B. (2009). *Mothers and Others: The Evolutionary Origins of Mutual Understanding*. Harvard University Press.
— Demonstrates that collective care is fundamental for the evolution of the human social mind. Connection to Primordial Mind: supports Level 2 (bonding and social vigilance).

Egalitarianism, Hierarchy, Punishment, Cooperation, and Social Regulation

Boehm, C. (1999). *Hierarchy in the Forest: The Evolution of Egalitarian Behavior*. Harvard University Press.

Boehm, C. (2012). *Moral Origins: The Evolution of Virtue, Altruism, and Shame*. Basic Books.

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature, 415*, 137–140. https://doi.org/10.1038/415137a

Tomasello, M. (2009). *Why We Cooperate*. MIT Press. https://doi.org/10.7551/mitpress/9780262013594.001.0001

Tomasello, M. (2016). *A Natural History of Human Morality*. Harvard University Press.

Intergroup Conflict, Human Aggression, and Intragroup Domestication

Wrangham, R. W., & Peterson, D. (1996). *Demonic Males: Apes and the Origins of Human Violence*. Houghton Mifflin.
— First major thesis on male coalitionary aggression.

Wrangham, R. W. (2019). *The Goodness Paradox*. Vintage.
— Combines proactive (intergroup) vs. reactive (intragroup) aggression + human domestication.

Wrangham, R., & Glowacki, L. (2012). Intergroup aggression in humans and chimpanzees. *Philosophical Transactions of the Royal Society B, 367*(1583), 2244–2254. https://doi.org/10.1098/rstb.2012.0035

McDonald, M. M., Navarrete, C. D., & van Vugt, M. (2012). Evolution and the psychology of intergroup conflict. *Personality and Social Psychology Review, 16*(4), 461–487. https://doi.org/10.1177/1088868312440042

Bowles, S. (2009). Did warfare drive human evolution? *Science, 324*(5932), 1293–1298. https://doi.org/10.1126/science.1168112

Cultural Psychology and Universality

Norenzayan, A. (2013). *Big Gods: How Religion Transformed Cooperation and Conflict*. Princeton University Press.

Legare, C. H., & Harris, P. L. (2016). The ontogeny of cultural learning. *Current Opinion in Psychology, 8*, 125–130. https://doi.org/10.1016/j.copsyc.2015.11.003

Social Neuroscience and the Social Brain: Neural Infrastructures of the Primordial Mind

Social Perception, Emotion Recognition, and Threat Evaluation

Adolphs, R. (2002). Recognizing emotion from facial expressions: Psychological and neurological mechanisms. *Behavioral and Cognitive Neuroscience Reviews, 1*(1), 21–62. https://doi.org/10.1177/1534582302001001003
— Classic review on emotion perception and amygdala lesions. Connection to Primordial Mind: grounds social vigilance and rapid primordial reactivity.

Adolphs, R. (2009). The social brain: Neural basis of social knowledge. *Annual Review of Psychology, 60*, 693–716. https://doi.org/10.1146/annurev.psych.60.110707.163514

Whalen, P. J. (1998). Fear, vigilance, and ambiguity. *Biological Psychiatry, 44*(9), 917–924. https://doi.org/10.1016/S0006-3223(98)00288-1
— Shows how the amygdala responds especially to ambiguous stimuli → basis for primordial threat bias.

Whalen, P. J., et al. (2007). Human amygdala responsivity to masked fearful eye whites. *Science, 306*, 2061. https://doi.org/10.1126/science.1103617
— Demonstrates ultrarapid subcortical processing → pillar of pre-reflective processing in Level 4.

Interoception, Insula, and Body–Affect Integration

Craig, A. D. (2009). How do you feel—now? The anterior insula and human awareness. *Nature Reviews Neuroscience, 10*(1), 59–70. https://doi.org/10.1038/nrn2555
— Shows how the insula integrates interoception, emotion, and consciousness. Connection to Primordial Mind: anatomical basis of Primordial Affective Screening.

Craig, A. D. (2015). *How Do You Feel? An Interoceptive Moment with Your Neurobiological Self*. Princeton University Press.

Salience Network: ACC + Insula + Amygdala

Seeley, W. W., et al. (2007). Dissociable intrinsic connectivity networks for salience processing and executive control. *Journal of Neuroscience, 27*(9), 2349–2356. https://doi.org/10.1523/JNEUROSCI.5587-06.2007
— First major mapping of salience and control networks.

Menon, V. (2015). Salience Network. In *Brain Mapping*. Elsevier. https://doi.org/10.1016/B978-0-12-397025-1.00242-8

Uddin, L. Q. (2015). Salience processing and insular cortical function and dysfunction. *Nature Reviews Neuroscience, 16*, 55–61. https://doi.org/10.1038/nrn3857
— Shows how salience networks modulate precision and affective screening.

Social Pain, Exclusion, and Belonging

Eisenberger, N. I., & Lieberman, M. D. (2004). Why rejection hurts. *Trends in Cognitive Sciences, 8*(7), 294–300. https://doi.org/10.1016/j.tics.2004.05.001
— Social pain = physical pain → Level 2 (social vigilance) + Transversal Mechanisms.

Eisenberger, N. I. (2012). The neural bases of social pain. *Nature Reviews Neuroscience, 13*(6), 421–434. https://doi.org/10.1038/nrn3231

Mentalizing, Intentions, and Social Cognition

Saxe, R., & Kanwisher, N. (2003). People thinking about thinking people. *Journal of Cognitive Neuroscience, 15*(8), 1139–1152. https://doi.org/10.1162/089892903322598173
— First demonstration of TPJ selectivity for theory of mind.

Frith, U., & Frith, C. D. (2006). The neural basis of mentalizing. *Neuron, 50*(4), 531–534. https://doi.org/10.1016/j.neuron.2006.05.001

Frith, C. D., & Frith, U. (2007). Social cognition in humans. *Current Biology, 17*(16), R724–R732. https://doi.org/10.1016/j.cub.2007.05.068

Empathy, Simulation, and Mirror Neurons

Preston, S. D., & de Waal, F. B. M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences, 25*(1), 1–20. https://doi.org/10.1017/S0140525X02000018
— Theoretical milestone on embodied empathy.

Rizzolatti, G., & Sinigaglia, C. (2008). *Mirrors in the Brain*. Oxford University Press.
— Classic review on motor and social simulation systems.

Social Relationships, Status, and Social Reward

Zink, C. F., et al. (2008). Know your place: Neural processing of social hierarchy. *Neuron, 58*(2), 273–283. https://doi.org/10.1016/j.neuron.2008.01.025
— Connects social status with dopaminergic circuits.

Cheng, J. T., Tracy, J. L., & Henrich, J. (2010). Pride, status, and cultural variation. *PNAS, 107*(30), 13324–13329. https://doi.org/10.1073/pnas.1005529107
— Connects prestige (admiration) vs. dominance (coercion).

Rilling, J. K., & Sanfey, A. G. (2011). The neuroscience of social decision-making. *Annual Review of Psychology, 62*, 23–48. https://doi.org/10.1146/annurev.psych.121208.131647

Emotional Reading and Others' Affective States

Nummenmaa, L., & Calder, A. J. (2013). Neural mechanisms of social attention. *Trends in Cognitive Sciences, 17*(9), 399–410. https://doi.org/10.1016/j.tics.2013.06.009

Prefrontal Damage, Social Decision-Making, and Regulation

Tranel, D. (2002). Prefrontal cortex and decision-making. *Philosophical Transactions of the Royal Society B*. https://doi.org/10.1098/rstb.2002.1193

Motivational Systems, Reward, Action, Aggression, and Valuation

Dopaminergic Reward and Motivation System

Schultz, W. (1997). A neural substrate of prediction and reward. *Science, 275*(5306), 1593–1599. https://doi.org/10.1126/science.275.5306.1593
— Discovery of the "dopamine reward prediction error." Connection to Primordial Mind: biological basis of the search/exploration module.

Schultz, W. (2016). Dopamine reward prediction-error signalling. *European Journal of Neuroscience, 45*(1), 3–14. https://doi.org/10.1111/ejn.13465

Berridge, K. C., & Robinson, T. E. (1998). What is the role of dopamine in reward? *Brain Research Reviews, 28*, 309–369. https://doi.org/10.1016/S0165-0173(98)00019-9
— Differentiates "wanting" (motivation) from "liking" (pleasure). Connection to Primordial Mind: explains exploration impulses even without pleasure.

Berridge, K. C., & Robinson, T. E. (2016). Liking, wanting, and the incentive-sensitization theory. *American Psychologist, 71*(8), 670–679. https://doi.org/10.1037/amp0000059

Defense Systems and Aggression

Fanselow, M. S., & Lester, L. S. (1988). A functional behavioristic approach to aversive motivation. In *Evolution and Learning*.
— Classic defense model: freeze → flight → fight. Connection to Primordial Mind: structuring of primordial defensive responses.

Mobbs, D., et al. (2007). When fear is near: Neural responses during imminent threat. *Science, 317*(5841), 1079–1083. https://doi.org/10.1126/science.1144298
— Shows with fMRI how the brain changes during distant vs. imminent threat.

Wrangham, R. W., & Peterson, D. (1996). *Demonic Males: Apes and the Origins of Human Violence*.
— Coalitional and male aggression. Connection to Primordial Mind: offensive aggression module.

Wrangham, R. (2019). *The Goodness Paradox*.
— Selection against reactive aggression → basis for human cooperation.

Attachment, Care, and Social Regulation Systems

Carter, C. S. (1998). Neuroendocrine perspectives on social attachment and love. *Psychoneuroendocrinology, 23*(8), 779–818. https://doi.org/10.1016/S0306-4530(98)00055-9
— Oxytocin as the foundation of attachment.

Feldman, R. (2012). Parent–infant synchrony. *Current Directions in Psychological Science, 21*(3), 160–165. https://doi.org/10.1177/0963721412447537
— Connection to Primordial Mind: origin of the bonding module.

Porges, S. (2011). *The Polyvagal Theory*.
— Autonomic regulation of social safety.

Aggression, Status, Competition, and Hierarchy

Sapolsky, R. M. (2005). The influence of hierarchy on primate health. *Science, 308*(5722), 648–652. https://doi.org/10.1126/science.1106477
— Status affects cortisol, immunity, and behavior.

Zink, C. F., et al. (2008). Know your place: Neural processing of social hierarchy. *Neuron, 58*, 273–283. https://doi.org/10.1016/j.neuron.2008.01.025

Cheng, J. T., et al. (2013). Two ways to the top: Dominance and prestige. *Journal of Personality and Social Psychology, 104*(1), 103–125. https://doi.org/10.1037/a0030398
— Connection to Primordial Mind: reinforces distinction between coercive vs. cooperative status.

Affective, Moral, and Social Decision-Making

Bechara, A. (2011). Emotion and decision making. *Neuron, 76*(3), 593–606. https://doi.org/10.1016/j.neuron.2012.10.020
— Prefrontal lesions → emotionally irrational decisions. Connection to Primordial Mind: empirical basis for Reflective Mind subordinated to affect.

Rolls, E. T. (2018). *The Brain, Emotion, and Decision-Making*. Oxford University Press.
— Affective valuation and reward.

Coalitions, Cooperation, Social Reward, and Punishment

Fehr, E., & Gächter, S. (2002). Altruistic punishment. *Nature, 415*, 137–140. https://doi.org/10.1038/415137a
— One of the pillars of the justice module.

Rilling, J. K., & Sanfey, A. G. (2007). The neuroscience of social decision-making. *Annual Review of Psychology, 62*, 23–48. https://doi.org/10.1146/annurev.psych.62.110707.163106

Decision-Making, Consciousness, Metacognition, and Cognition

Consciousness and Global Integration (Workspace Model)

Baars, B. J. (1997). *In the theater of consciousness*. Oxford University Press.
— Proposes the "Global Workspace": consciousness as a global broadcasting space. Connection to Primordial Mind: provides a neurocomputational explanation for Level 5 (Modern Mind).

Dehaene, S. (2014). *Consciousness and the brain*. Penguin. https://doi.org/10.7551/mitpress/9780262035090.001.0001
— ICP (Imagistic/Conceptual/Programmatic) encoding; conscious access as "global ignition." Connection to Primordial Mind: explains why few primordial contents reach reflective level.

Dehaene, S., & Changeux, J.-P. (2011). Experimental and theoretical approaches to conscious processing. *Neuron, 70*(2), 200–227. https://doi.org/10.1016/j.neuron.2011.03.018

Mashour, G. A., Roelfsema, P., Changeux, J.-P., & Dehaene, S. (2020). Conscious processing and global ignition. *Neuron*. https://doi.org/10.1016/j.neuron.2020.01.026

Metacognition and Internal Monitoring

Fleming, S. M., & Dolan, R. J. (2012). The neural basis of metacognitive ability. *Philosophical Transactions of the Royal Society B, 367*, 1338–1349. https://doi.org/10.1098/rstb.2011.0417
— mPFC, insula, and precuneus encode confidence and self-error evaluation. Connection to Primordial Mind: neurobiological basis for reflective revisions of the Modern Mind.

Shea, N., & Frith, C. (2019). The global workspace needs metacognition. *Trends in Cognitive Sciences, 23*(7), 560–571. https://doi.org/10.1016/j.tics.2019.04.007
— Argues that reflective consciousness requires internal state monitoring.

Seth, A. K. (2021). *Being you: A new science of consciousness*.
— Consciousness as "predictive control of the body." Connection to Primordial Mind: explains body–emotion–prediction integration in the Primordial Affective Screening.

Predictive Consciousness, Active Inference, and Self-Perception

Friston, K. (2010). The free-energy principle. *Nature Reviews Neuroscience, 11*, 127–138. https://doi.org/10.1038/nrn2787
— Brain as a surprise-reduction machine. Connection to Primordial Mind: underpins Primordial Affective Screening (precision weighting, vigilance, valuation).

Clark, A. (2013). Whatever next? Predictive processing. *Behavioral and Brain Sciences, 36*, 181–204. https://doi.org/10.1017/S0140525X12000477

Hohwy, J. (2013). *The predictive mind*. Oxford University Press.
— Strong advocacy of Bayesian perception models.

Seth, A., Suzuki, K., & Critchley, H. (2012). An interoceptive predictive coding model of conscious presence. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2011.00395
— Connection to Primordial Mind: supports the role of the body as the basis of primary emotional valence.

Moral Decision-Making and Motivated Rationality

Haidt, J. (2001). The emotional dog and its rational tail. *Psychological Review, 108*(4), 814–834. https://doi.org/10.1037/0033-295X.108.4.814
— Morality is intuitive and post-rationalized. Connection to Primordial Mind: explains conflicts between primordial levels and modern rationality.

Greene, J. (2013). *Moral tribes*.
— Moral dilemmas as conflicts between evolved intuitions and deliberative reasoning.

Kahneman, D. (2011). *Thinking, fast and slow*.
— System 1 (fast, emotional) vs. System 2 (slow, deliberative). Connection to Primordial Mind: theoretical framework for conflicts between Level 2–4 and Level 5.

Cognition, Working Memory, and Executive Functions

Badre, D. (2008). Cognitive control hierarchy. *Neuron, 59*(2), 193–205. https://doi.org/10.1016/j.neuron.2008.06.012
— Prefrontal hierarchy of goal organization.

D'Esposito, M., & Postle, B. R. (2015). The cognitive neuroscience of working memory. *Annual Review of Psychology*. https://doi.org/10.1146/annurev-psych-010814-015031

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience, 24*, 167–202. https://doi.org/10.1146/annurev.neuro.24.1.167
— Connection to Primordial Mind: explains the Modern Mind's limited capacity to modulate instincts.

Phenomenology, Body, and Intersubjectivity

Merleau-Ponty, M. (1945). *Phenomenology of perception*.
— The body as the condition of possibility for the mind. Connection to Primordial Mind: philosophical basis for interoception as a primordial psychological axis.

Gallagher, S. (2005). *How the body shapes the mind*.
— Embodied cognition.

Fuchs, T. (2018). *Ecology of the brain*.
— Lived time, affectivity, and intercorporeality. Connection to Primordial Mind: underpins the pre-reflective affective level of the ontology.

Philosophy, Ontology, and Epistemology of the Mind

Philosophy of Action, Ethics, and Motivation

Aristotle. (various translations). *Nicomachean Ethics*.
— Telos, virtue, and intentional action. Connection to Primordial Mind: differentiates appetitive motivation (Level 2/3) from deliberate action (Level 5).

Hobbes, T. (1651/1996). *Leviathan*. Cambridge University Press. https://doi.org/10.1017/CBO9780511803559

— Human nature, conflict, social order. Connection to Primordial Mind: framework for coalitionary aggression (Level 3/4) and need for cultural containment.

Nietzsche, F. (1887/2006). *On the Genealogy of Morality*.
— Impulses, ressentiment, critique of idealized rationality. Connection to Primordial Mind: reinforces affectivity as a primary force of psychic organization.

Schopenhauer, A. (1819/1969). *The World as Will and Representation*.
— Will as a pre-reflective foundation. Connection to Primordial Mind: maps the affective–instinctive layer of Level 2/3 ontology.

Taylor, C. (1989). *Sources of the Self*. Harvard University Press.
— Identity, agency, and modernity. Connection to Primordial Mind: explains symbolic and ethical architecture of the Modern Mind.

Phenomenology, Body, and Experience

Husserl, E. (1913/1982). *Ideas I*.
— Intentionality and structure of consciousness.

Merleau-Ponty, M. (1945). *Phenomenology of Perception*.
— Body as the matrix of perception. Connection to Primordial Mind: philosophical basis for interoception and "feeling the body as self."

Zahavi, D. (2005). *Subjectivity and Selfhood*. MIT Press. https://doi.org/10.7551/mitpress/2410.001.0001
— Pre-reflective self, first-person perspective. Connection to Primordial Mind: structure of Level 4 (proto-affective subjectivity).

Fuchs, T. (2018). *Ecology of the Brain*. Oxford University Press.
— Temporality, affectivity, intercorporeality.

Varela, F., Thompson, E., & Rosch, E. (1991). *The Embodied Mind*. MIT Press. https://doi.org/10.7551/mitpress/9780262520503.001.0001
— 4E cognition (embodied, embedded, enacted, extended). Connection to Primordial Mind: provides philosophical roots for neuro-phenomenological integration.

Philosophy of Mind, Cognition, and Language

Dennett, D. (1991). *Consciousness Explained*. Little, Brown.
— Computational models, "heterophenomenology."

Searle, J. (1992). *The Rediscovery of the Mind*. MIT Press.
— Critique of computationalism.

Clark, A., & Chalmers, D. (1998). The extended mind. *Analysis, 58*(1), 7–19. https://doi.org/10.1093/analys/58.1.7
— Extended cognition. Connection to Primordial Mind: relation between symbolic externalization and the Modern Mind.

Quine, W. V. O. (1960). *Word and Object*. MIT Press.
— Indeterminacy of translation; behavior as the basis of language. Connection to Primordial Mind: compatible with cognitive ecology and cultural niches.

Deacon, T. W. (1997). *The Symbolic Species*. W.W. Norton.
— Evolution of language and symbol. Connection to Primordial Mind: fundamental for understanding transition from Level 3 → 5.

Donald, M. (1991). *Origins of the Modern Mind*. Harvard University Press.
— Mimetic → mythic → theoretic stages. Connection to Primordial Mind: foundation for the evolution of the Modern Mind.

Anthropology, Culture, and Symbolic Systems

Geertz, C. (1973). *The Interpretation of Cultures*. Basic Books.
— Culture as a system of meaning. Connection to Primordial Mind: symbolic structures shaping Level 5.

Bourdieu, P. (1977). *Outline of a Theory of Practice*. Cambridge University Press.
— Habitus, practices, and structures. Connection to Primordial Mind: mediates between primordial dispositions and cultural contexts.

Turner, V. (1969). *The Ritual Process*. Aldine.
— Liminality, performance, collective emotional regulation. Connection to Primordial Mind: role of rituals as modulators of Affective Screening.

Durkheim, É. (1912). *The Elementary Forms of Religious Life*.
— Rituals, social cohesion.

Evolutionary Ontology, Epistemology, and Science

Lorenz, K. (1977). *The Foundations of Ethology*. Springer.
— Evolutionary epistemology. Connection to Primordial Mind: grounds the idea of cognitive modules shaped by ancestral pressures.

Tinbergen, N. (1963). On aims and methods of ethology. *Zeitschrift für Tierpsychologie, 20*, 410–433. https://doi.org/10.1111/j.1439-0310.1963.tb01161.x
— Four levels of biological explanation. Connection to Primordial Mind: structuring the ontology in levels.

Popper, K. (1959). *The Logic of Scientific Discovery*.
— Falsifiability principle.

Wilson, E. O. (1998). *Consilience*.
— Unification of sciences. Connection to Primordial Mind: ultimate goal of the theory.

Meehl, P. (1990). Why theories fail. *Psychological Reports*.
— Incremental prediction. Connection to Primordial Mind: defense of the predictive character of the ontology.

Sperber, D. (1996). *Explaining Culture*.
— Epidemiology of representations. Connection to Primordial Mind: cultural transmission as a cognitive ecosystem.

Evolutionary Anthropology, Tribality, Cooperation, and Conflict

Band Structures, Hunter-Gatherers, and Pleistocene Ecology

Kelly, R. L. (2013). *The Lifeways of Hunter-Gatherers*. Cambridge University Press. https://doi.org/10.1017/CBO9781139149387
— Band structures, mobility, kinship networks, small-scale cooperation. Connection to Primordial Mind: structural basis of Level 0.

Lee, R. B., & Daly, R. (Eds.). (1999). *The Cambridge Encyclopedia of Hunters and Gatherers*.
— Comparative ethnographies of foraging societies. Connection to Primordial Mind: evidence for ancestral social calibration.

Konner, M. (2010). *The Evolution of Childhood*. Harvard University Press.
— Development in band contexts; cooperative caregiving. Connection to Primordial Mind: underpins aspects of Level 2 (vigilance, trust, coalition formation).

Hill, K., & Hurtado, A. M. (1996). *Ache Life History*. Aldine.
— Data on proximity, coalition formation, mortality, cooperation. Connection to Primordial Mind: parameters for ancestral social heuristics.

Hill, K., et al. (2011). Co-residence patterns in hunter-gatherers. *Science, 331*, 1286–1289. https://doi.org/10.1126/science.1199071
— Multigenerational social constellations. Connection to Primordial Mind: essential for modeling Level 0 social architecture.

Egalitarianism, Hierarchies, Coalition Formation, and Domination

Boehm, C. (1999). *Hierarchy in the Forest*. Harvard University Press.
— Vigilant egalitarianism; coalition against dominants. Connection to Primordial Mind: foundation of non-idealized “moral root” at Level 2/3.

Boehm, C. (2012). *Moral Origins*. Basic Books.
— Cooperative punishment, pre-state social control. Connection to Primordial Mind: strong link with affective screening and regulated aggression.

Wrangham, R. (2019). *The Goodness Paradox*. Vintage.
— Human domestication, reactive vs. proactive aggression. Connection to Primordial Mind: grounds the instinctive aggression module (Level 3).

Wrangham, R., & Peterson, D. (1996). *Demonic Males*.
— Coalitionary aggression and intergroup dynamics. Connection to Primordial Mind: selective pressures for vigilance and coalition formation (Level 2/3).

Wrangham, R., & Glowacki, L. (2012). Intergroup conflict in chimpanzees and humans. *Human Nature, 23*, 5–29. https://doi.org/10.1007/s12110-012-9132-1
— Comparisons of coalition and primitive warfare.

Cumulative Cultural Evolution, Cultural Niches, and Universal Social Psychology

Henrich, J. (2015). *The Secret of Our Success*. Princeton University Press.
— Mechanisms of cumulative cultural learning. Connection to Primordial Mind: cross-level mechanisms (learning, symbolization).

Henrich, J. (2020). *The WEIRDest People in the World*.
— Cultural norms shaping psychology and motivation. Connection to Primordial Mind: cultural modulation of Level 5 over lower levels.

Boyd, R., & Richerson, P. J. (1985). *Culture and the Evolutionary Process*. University of Chicago Press.
— Gene–culture coevolution. Connection to Primordial Mind: formal basis for cultural mechanisms as evolutionary forces.

Legare, C. H., & Harris, P. L. (2016). The ontogeny of cultural learning. *Child Development, 87*(3). https://doi.org/10.1111/cdev.12542
— Acquisition of rituals, norms, techniques.

Tomasello, M. (2019). *Becoming Human*. Harvard University Press.
— Shared intentionality, ultra-social cooperation. Connection to Primordial Mind: foundation of Level 5 (reflective mind, normative morality).

Prestige vs. Dominance, Status, Cooperation, and Reputation

Cheng, J. T., Tracy, J. L., & Henrich, J. (2013). Dominance and prestige. *Psychological Review, 120*(3), 559–584. https://doi.org/10.1037/a0030273
— Dual-status model. Connection to Primordial Mind: sensitivity to prestige and dominance integrates Level 2 heuristics.

Zink, C. F., et al. (2008). Neural processing of social status. *Neuron, 58*, 273–283. https://doi.org/10.1016/j.neuron.2008.02.031
— Neural correlates of status. Connection to Primordial Mind: interface between Level 1 (infrastructure) and Level 2 (social mechanisms).

Fehr, E., & Gächter, S. (2002). Altruistic punishment. *Nature, 415*, 137–140. https://doi.org/10.1038/415137a
— Altruistic punishment, cooperation.

Trivers, R. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology, 46*, 35–57.
— Structure of reciprocity.

Aggression, Defense, Conflict, and Coalition Formation

McDonald, M. M., Navarrete, C. D., & Van Vugt, M. (2012). Evolution and the psychology of intergroup conflict. *Philosophical Transactions B, 367*, 670–679. https://doi.org/10.1098/rstb.2011.0309

— Coalitionary psychology. Connection to Primordial Mind: motivational basis for coalitionary aggression (Level 3).

Wilson, M. L., et al. (2014). Lethal aggression in chimpanzees. *Nature, 513*, 414–417. https://doi.org/10.1038/nature13727
— Patterns of coalitionary attack.

Haun, D., et al. (2006). Evolutionary psychology of ingroup bias. *PNAS, 103*(35), 12931–12935. https://doi.org/10.1073/pnas.0601438103
— Cross-cultural ingroup bias.

Rituals, Synchrony, and Social Cohesion

Xygalatas, D. (2013). *The Burning Saints*. Oxford University Press.
— Intense rituals, physiological synchrony. Connection to Primordial Mind: affective modulation of Level 4 and cohesion of Level 5.

Fischer, R., et al. (2014). Synchrony and cooperation. *Journal of Experimental Social Psychology, 55*, 1–6. https://doi.org/10.1016/j.jesp.2014.05.004
— Synchronized rituals increase trust.

Durkheim, É. (1912). *The Elementary Forms of Religious Life*.
— Collective effervescence, group morality.