

PHYSIOLOGICAL BASIS OF TRIGUNA THEORY: EXPLORING THE
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ABSTRACT

The Triguna theory—Sattva, Rajas, and Tamas—is a core concept in Ayurveda, describing the three fundamental psychological qualities that shape human behavior and consciousness. These Gunas are considered dynamic and interdependent, influencing physical, mental, and emotional health. **Aim:** The aim of this review is to explore the physiological and neuropsychological correlates of the Triguna theory and to establish possible connections between Ayurvedic psychological attributes and modern scientific frameworks such as neurochemistry, brain wave activity, and stress response systems. **Materials and Method:** This is a narrative review based on secondary data sourced from peer-reviewed journals, Ayurvedic texts, and neuroscience literature. Key sources include psychometric assessments like the Vedic Personality Inventory, EEG studies, and neurobiological models of behavior. The review synthesizes classical Ayurvedic interpretations with contemporary findings on neurotransmitters, brain structures, and stress physiology. **Conclusion:** The integration of Triguna theory with modern physiological models provides a holistic understanding of personality and mental health. Sattva, Rajas, and Tamas can be mapped to specific neuropsychological patterns, offering insights into personalized healthcare.

KEYWORDS: The review synthesizes classical Ayurvedic interpretations with contemporary findings on neurotransmitters, brain structures, and stress physiology.

INTRODUCTION

The concept of Triguna—Sattva, Rajas, and Tamas—is a central tenet of ancient Indian philosophy and Ayurveda. Originating from the **Samkhya school**, the Gunas represent the fundamental psychological and behavioral qualities that govern human nature. Sattva is associated with clarity, harmony, and purity; Rajas with activity, ambition, and restlessness; and Tamas with inertia, ignorance, and heaviness.^[1] While traditionally metaphysical, these traits have found relevance in modern psychological and physiological contexts. An increasing number of scholars and researchers are attempting to explore the scientific validity of the Triguna theory by correlating it with **neurotransmitter systems, brain activity, and personality traits**.

The importance of this review lies in its attempt to bridge the gap between ancient Ayurvedic psychology and modern neuropsychology. By mapping the three Gunas onto measurable physiological parameters—such as brain wave frequencies, stress response systems, and neurochemical patterns—we gain deeper insights into the

mind-body connection. Moreover, such integration could lead to **personalized wellness strategies**, especially in the context of stress-related disorders, emotional regulation, and preventive mental healthcare.

METHODOLOGIES**1. Psychometric Mapping and Neurochemical Correlates**

One of the earliest methods for evaluating Triguna traits in individuals is through **psychometric tools** like the **Vedic Personality Inventory (VPI)** and the **Guna Questionnaire**. These inventories assess an individual's personality based on self-reported tendencies related to each Guna.^[2] Researchers have attempted to correlate these traits with **neurochemical markers**. For example, **Sattva** is linked to balanced levels of **serotonin**, the neurotransmitter associated with well-being and emotional regulation.^[3] **Rajas**, due to its excitatory nature, correlates with elevated **dopamine and norepinephrine**, which are implicated in motivation and anxiety.^[4] **Tamas** is often associated with increased

GABA activity and lower **cortical arousal**, reflecting withdrawal, apathy, and depressive symptoms.^[5]

2. Theories of Brain Wave Activity and Guna Expression

Another methodology comes from **EEG-based studies**, which analyze brain wave patterns corresponding to Guna dominance. Sattva is predominantly linked with **alpha wave activity**, which reflects relaxed alertness and cognitive clarity.^[6] Rajas correlates with **beta wave dominance**, indicative of high mental activity, tension, and restlessness. Tamas is associated with **delta wave prevalence**, reflecting sluggish cognitive states and reduced mental engagement.^[7] This mapping provides an electrophysiological basis for ancient psychological traits.

DISCUSSION

The Triguna theory, though rooted in ancient Indian philosophy, aligns surprisingly well with modern models of **neurophysiology and behavior**. Each Guna represents not only a psychological disposition but also a potential **biological state**, making this framework highly relevant for integrative medicine and psychology.

Sattva, representing harmony and self-awareness, is neurobiologically reflected in balanced serotonergic activity, increased alpha wave generation, and activation of the **prefrontal cortex**, the seat of higher-order cognition.^[8] These individuals demonstrate **emotional regulation**, ethical decision-making, and cognitive resilience. In terms of the **HPA (hypothalamic-pituitary-adrenal) axis**, Sattvic individuals are believed to exhibit a **well-regulated stress response**, promoting homeostasis and psychological well-being.^[9]

Rajas, the Guna of action and agitation, often manifests as **sympathetic nervous system (SNS) dominance**, heightened cortisol levels, and dopaminergic hyperactivity.^[10] Individuals with Rajasic tendencies may experience increased ambition but also suffer from anxiety, impulsiveness, and restlessness. EEG studies have confirmed the prevalence of **beta waves**, which, while useful for focus, can be detrimental when chronically elevated, leading to mental fatigue and stress.^[11] Such patterns are often observed in people with **Type A personality traits** or those with occupational burnout.

Tamas, by contrast, reflects inertia and dullness, and its physiological correlates include **low arousal**, dominance of **delta waves**, and **GABAergic inhibition**. The underactivity of the **prefrontal cortex** and overactivity of the **limbic system** seen in Tamas-dominant individuals are common features in depressive and apathetic states.^[12] Moreover, the **blunted response** of the HPA axis seen in Tamasic individuals aligns with chronic fatigue, low motivation, and poor stress coping.^[13]

Integrating these physiological observations with Guna theory can transform our understanding of **personality, psychopathology, and preventive health**. It offers a model that is both ancient and modern, qualitative and quantitative. The clinical implications are wide-ranging—from using Guna assessments to guide **therapy selection** to employing **yogic and Ayurvedic interventions** for Guna modulation. For example, yoga and meditation practices have shown to **enhance Sattva** while reducing Rajas and Tamas.^[14] Studies on long-term meditators reveal changes in brain structure, such as **increased cortical thickness** and improved **functional connectivity**, especially in regions responsible for attention and emotional regulation.^[15]

Nevertheless, empirical validation remains a challenge. While preliminary psychometric and neurophysiological studies are promising, more rigorous investigations using **neuroimaging, hormonal assays, and longitudinal studies** are needed to establish concrete physiological correlates. Another limitation is the **cultural specificity** of Guna theory, which may limit its applicability in non-Indian contexts unless adapted thoughtfully.

Despite these limitations, the Triguna model offers a comprehensive, dynamic, and integrative approach to human psychology. It unites mind, behavior, and physiology within a singular framework and provides a tool for both self-awareness and clinical intervention. As integrative medicine continues to evolve, embracing such time-tested philosophies through the lens of modern science may enrich the future of healthcare.

CONCLUSION

The Triguna theory, though ancient, remains remarkably relevant in the modern era of neuroscience and psychology. By correlating Sattva, Rajas, and Tamas with neurochemical activity, brainwave patterns, and stress responses, a more nuanced understanding of human personality and mental health emerges. The alignment of these Gunas with physiological markers opens the possibility for diagnostic tools, personalized interventions, and preventive health strategies grounded in integrative medicine. Moreover, it encourages a deeper exploration of consciousness, behavior, and wellness. While scientific validation is ongoing, the physiological study of Trigunas offers a powerful bridge between Ayurveda and modern neurobiology, ultimately aiming for a more holistic and personalized approach to health and healing.

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