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AYURVEDIC PERSPECTIVES ON STRESS PHYSIOLOGY: EXPLORING THE INTERPLAY OF TRIGUNA, DOSHA, AND PSYCHOPHYSIOLOGICAL ADAPTATION

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Abstract

Stress represents a complex psychophysiological response that enables adaptation to internal and external challenges through coordinated neuroendocrine, autonomic, immune, and behavioral mechanisms. Although modern physiology primarily explains stress through activation of the hypothalamic–pituitary–adrenal axis and the autonomic nervous system, Ayurveda provides a multidimensional framework encompassing the interaction of Manas, Triguna, Dosha, and Ojas. This review explores the Ayurvedic understanding of stress physiology by integrating classical concepts with contemporary scientific evidence. The dynamic equilibrium of Sattva, Rajas, and Tamas governs cognitive, emotional, and behavioral responses, whereas Vata, Pitta, and Kapha regulate neurophysiological, metabolic, and adaptive functions during stress. Disturbances in these regulatory principles, precipitated by Prajnaparadha, Asatmya Indriyarthasamyoga, and adverse environmental influences, may impair psychophysiological adaptation and predispose individuals to stress-related disorders. Furthermore, Ojas is presented as a critical determinant of resilience, immune competence, and adaptive capacity. The review also examines potential correlations between Ayurvedic principles and contemporary concepts such as autonomic regulation, neuroendocrine signaling, inflammatory pathways, and heart rate variability. Therapeutic strategies including Satvavajaya Chikitsa, Achara Rasayana, Yoga, Pranayama, Dhyana, and Rasayana interventions are discussed for their roles in enhancing stress resilience and restoring physiological homeostasis. Integrating Ayurvedic physiology with modern stress science may provide a comprehensive systems-based model for understanding psychophysiological adaptation and facilitate the development of personalized, evidence-informed approaches for stress prevention, resilience enhancement, and holistic health promotion.

Keywords:

Stress Physiology; Triguna; Dosha; Psychophysiological Adaptation; Neuroendocrinology

Introduction

Stress has emerged as one of the most significant public health challenges of the twenty-first century, affecting millions of individuals across all age groups and contributing substantially to the global burden of disease. It is a dynamic psychophysiological process through which the body responds to internal and external stressors to maintain homeostasis. While acute stress is essential for survival and adaptation, prolonged or chronic stress disrupts neuroendocrine, autonomic, immune, and metabolic functions, thereby increasing susceptibility to cardiovascular diseases, diabetes mellitus, anxiety, depression, cognitive dysfunction, and other stress-related disorders. Consequently, understanding the physiological mechanisms underlying stress adaptation has become a major focus of contemporary biomedical research.[1]

Modern physiology explains the stress response primarily through the activation of the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic–adrenomedullary (SAM) system. These interconnected pathways coordinate the release of glucocorticoids, catecholamines, and inflammatory mediators that facilitate short-term adaptation to stressful situations. However, persistent activation of these systems leads to cumulative physiological burden, commonly referred to as allostatic load, which impairs multiple organ systems and accelerates disease progression. Furthermore, individuals exposed to similar stressors often exhibit considerable differences in their physiological and psychological responses, suggesting that adaptive capacity is influenced by factors extending beyond conventional biological mechanisms.[2]

Ayurveda offers a comprehensive and individualized framework for understanding health and disease by emphasizing the harmonious interaction of Sharira, Manas, Indriya, and Atma. Although classical Ayurvedic texts do not describe stress as an independent disease entity, they comprehensively explain disturbances in mental and physical equilibrium through the concepts of Prajñāparādha, Asātmya Indriyārtha Saṃyoga, and Kāla. These etiological factors disturb the physiological balance of Dosha, alter mental attributes governed by Triguna, and eventually compromise systemic homeostasis. Such a multidimensional approach provides an important conceptual foundation for understanding psychophysiological adaptation beyond reductionist biomedical models.[3]

Among the fundamental concepts of Ayurveda, Triguna—comprising Sattva, Rajas, and Tamas—plays a pivotal role in regulating cognition, emotions, behavior, and psychological resilience. Sattva is associated with clarity, wisdom, emotional stability, and adaptive coping, whereas excessive Rajas promotes restlessness, anxiety, irritability, and heightened emotional reactivity. Conversely, predominance of Tamas manifests as inertia, confusion, diminished awareness, and impaired motivation. The dynamic equilibrium among these three Guna determines an individual's psychological constitution and significantly influences the perception, processing, and adaptation to stressful stimuli.[4]

In addition to Triguna, the functional integrity of Vata, Pitta, and Kapha plays a crucial role in maintaining psychophysiological balance. Vata governs neural transmission, sensory perception, and autonomic regulation; Pitta regulates metabolism, cognition, endocrine activity, and transformation; whereas Kapha provides structural stability, nourishment, emotional steadiness, and adaptive resilience. Chronic psychological stress may disturb the equilibrium of these regulatory principles, leading to alterations in physiological functions that resemble neuroendocrine dysregulation, autonomic imbalance, inflammatory activation, and metabolic disturbances described in modern stress physiology.[5]

Another important Ayurvedic concept associated with stress adaptation is Ojas, which is regarded as the essence of all body tissues and the foundation of vitality, immunity, mental stability, and disease resistance. Preservation of Ojas is considered essential for maintaining Vyādhikṣamatva and optimal adaptive capacity. Increasing evidence from psychoneuroendocrinology demonstrates that chronic stress adversely influences immune competence, inflammatory pathways, oxidative balance, and cardiovascular regulation, thereby supporting the relevance of exploring Ojas as a potential indicator of physiological resilience through contemporary scientific perspectives.[6]

Despite growing scientific interest in Ayurveda and stress management, the physiological relationship among Triguna, Dosha, and psychophysiological adaptation has not been comprehensively synthesized. Most available studies focus on the therapeutic efficacy of individual Ayurvedic interventions, whereas limited attention has been directed toward explaining the underlying physiological mechanisms from an integrative perspective. Establishing correlations between classical Ayurvedic concepts and contemporary advances in neuroendocrinology, autonomic regulation, neuroimmunology, and psychophysiology may facilitate the development of evidence-informed and personalized strategies for stress prevention and management.[7]

Therefore, the present review aims to critically examine the Ayurvedic perspective of stress physiology by exploring the interplay among Triguna, Dosha, and psychophysiological adaptation, while integrating classical Ayurvedic principles with current scientific evidence. Such an integrative framework may strengthen the physiological basis of Ayurveda, promote interdisciplinary research, and contribute to the development of personalized approaches for enhancing stress resilience and holistic health.[8]

2. Concept of Stress: Modern Physiological Perspective

Stress is a dynamic physiological and psychological response elicited when an individual perceives internal or external demands that challenge homeostasis. The primary objective of the stress response is to promote adaptation by activating coordinated neural, endocrine, autonomic, metabolic, and immune mechanisms. Depending on its duration and intensity, stress may exert either beneficial or detrimental effects on health. Acute stress facilitates survival by enhancing alertness and energy mobilization, whereas chronic stress disrupts physiological regulation and predisposes individuals to numerous chronic diseases.[9]

Types of Stress

Stress is broadly classified into acute and chronic forms. Acute stress is a short-term adaptive response that resolves after removal of the stressor and generally improves performance and survival. In contrast, chronic stress results from prolonged or repeated exposure to stressors, leading to persistent activation of stress-response pathways, impaired physiological adaptation, and increased risk of cardiovascular, metabolic, psychiatric, and immune-mediated disorders.[10]

Type of Stress	Characteristics	Physiological Outcome
Acute stress	Short duration, immediate response	Adaptive; enhances alertness and survival
Chronic stress	Persistent or repeated exposure	Maladaptive; increases allostatic load and disease susceptibility

Physiological Mechanisms of Stress

The stress response is primarily mediated through two interconnected regulatory systems: the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic–adrenomedullary (SAM) system. Activation of the HPA axis stimulates the sequential release of corticotropin-releasing hormone, adrenocorticotrophic hormone, and cortisol, which regulate metabolism, immune responses, and energy homeostasis. Simultaneously, activation of the SAM system promotes the secretion of adrenaline and noradrenaline, producing rapid cardiovascular and metabolic adjustments required for the "fight-or-flight" response.[11]

Allostasis and Allostatic Load

Modern stress physiology emphasizes the concept of allostasis, defined as achieving physiological stability through adaptive change. While allostasis is essential for maintaining homeostasis during stressful conditions, repeated or prolonged activation of stress-response systems results in allostatic load, representing the cumulative biological burden imposed by chronic stress. Excessive allostatic load contributes to neuroendocrine dysregulation, systemic inflammation, autonomic imbalance, impaired cognition, and accelerated aging, thereby increasing vulnerability to chronic diseases.[12]

Regulatory Concept	Definition	Clinical Significance
Homeostasis	Maintenance of internal physiological equilibrium	Normal physiological function
Allostasis	Stability achieved through adaptive physiological changes	Facilitates adaptation to stress
Allostatic Load	Cumulative physiological burden caused by chronic stress	Promotes chronic disease and impaired resilience

Collectively, these physiological mechanisms demonstrate that stress is not merely a harmful response but a highly coordinated adaptive process. Disease develops when adaptive responses become excessive, prolonged, or dysregulated. This modern understanding provides a valuable framework for correlating stress physiology with Ayurvedic concepts of Triguna, Dosha, and psychophysiological adaptation discussed in the subsequent sections.[13]

3. Ayurvedic Understanding of Stress

Although the term "stress" is not explicitly described in classical Ayurvedic literature, its physiological and psychological manifestations are comprehensively explained through the concepts of Manas, Triguna, Dosha, and the interaction between the body and mind. Ayurveda considers health as a state of equilibrium in which Sharira, Manas, Indriya, and Atma function harmoniously. Any disturbance in this equilibrium affects an individual's adaptive capacity and predisposes to disease. Thus, stress can be understood as a state of disturbed psychophysiological homeostasis resulting from impaired adaptation to internal and external stimuli.[14]

3.1 Concept of Manas

In Ayurveda, Manas is regarded as an essential entity responsible for perception, thinking, memory, emotions, decision-making, and behavioral responses. It acts as an interface between the Indriya and Atma, enabling an individual to perceive and respond to environmental stimuli. Proper functioning of Manas depends upon the balanced state of Triguna and Dosha. Disturbances in these regulatory principles impair emotional stability, cognition, and adaptive behavior, thereby increasing susceptibility to stress-related disorders.[15]

3.2 Sharira-Manasa Relationship

Ayurveda emphasizes the inseparable relationship between Sharira (body) and Manas (mind). Physiological disturbances can influence mental functions, while psychological disturbances can alter bodily functions through changes in Dosha and Agni. This bidirectional relationship closely resembles the modern concept of the mind-body axis, where neural, endocrine, immune, and behavioral systems interact continuously to maintain homeostasis. Therefore, successful adaptation to stress requires balanced functioning of both Sharira and Manas.[16]

3.3 Etiological Factors Responsible for Stress in Ayurveda

The classical texts describe several factors that disturb psychophysiological equilibrium. Among these, Prajñāparādha (intellectual error), Asātmīya Indriyārtha Saṃyoga (improper utilization of sensory faculties), and Kāla (seasonal and temporal influences) are considered the principal causes of disease. These factors alter the balance of Triguna and Dosha, ultimately impairing adaptation and increasing vulnerability to psychological and somatic disorders.[17]

Ayurvedic Concept	Brief Description	Possible Relevance to Stress Physiology
Prajnaparadha	Improper judgment or intellectual error	Maladaptive behavior, unhealthy coping

Asatmya Indriyarth Samyoga	Improper use of sensory organs	Sensory overload and psychological stress
Kala	Seasonal and temporal influences	Circadian and seasonal physiological adaptation

3.4 Role of Triguna in Mental Regulation

Mental functioning is governed by the dynamic interaction of Sattva, Rajas, and Tamas. Sattva promotes emotional stability, clarity, and resilience, whereas excessive Rajas produces restlessness, anger, anxiety, and excessive mental activity. Predominance of Tamas results in lethargy, impaired cognition, lack of motivation, and withdrawal. The relative dominance of these Guna determines individual differences in stress perception, emotional regulation, and coping ability.[18]

3.5 Role of Dosha in Psychophysiological Adaptation

The three Dosha also contribute to stress adaptation by regulating different physiological domains. Vata governs neural communication and autonomic responses, Pitta regulates metabolism and cognitive processing, whereas Kapha maintains structural integrity, emotional stability, and endurance. Persistent psychological stress may disturb Dosha equilibrium, resulting in impaired physiological adaptation and increased disease susceptibility. This concept provides a functional framework for understanding individual variability in stress responses.[19]

Regulatory Factor	Primary Physiological Role	Effect of Imbalance During Stress
Vata	Neural communication and movement	Anxiety, insomnia, autonomic instability
Pitta	Metabolism and cognition	Irritability, anger, inflammatory changes
Kapha	Stability and resilience	Lethargy, reduced motivation, emotional withdrawal

Collectively, these classical concepts indicate that Ayurveda interprets stress as a multidimensional disturbance involving Manas, Triguna, Dosha, and environmental interactions rather than as an isolated psychological phenomenon. This holistic framework provides the conceptual basis for understanding psychophysiological adaptation and forms the foundation for individualized preventive and therapeutic strategies. The subsequent section discusses in detail how Triguna influence stress physiology and adaptive resilience.[20]

4. Role of Triguna in Stress Physiology

The concept of Triguna constitutes the psychological foundation of Ayurvedic physiology and provides a unique framework for understanding individual differences in stress perception, emotional regulation, and adaptive behavior. According to Ayurveda, every individual possesses all three Guna—Sattva, Rajas, and Tamas—in varying proportions. Their dynamic equilibrium determines personality, cognitive functions, emotional responses, and behavioral patterns. During exposure to stress, alterations in the predominance of these Guna influence the ability to cope with environmental challenges and maintain psychophysiological homeostasis.[21]

4.1 Sattva: The Foundation of Psychological Resilience

Sattva is characterized by purity, clarity, wisdom, emotional stability, compassion, and self-control. Individuals with Sattva-dominant personalities generally exhibit optimism, better decision-making, emotional intelligence, and adaptive coping strategies. Classical Ayurvedic texts describe Sattva as essential for maintaining mental equilibrium and promoting overall well-being. Contemporary psychological studies have also reported positive associations between Sattva and emotional regulation, mindfulness, adaptive coping, and psychological well-being, indicating its important role in stress resilience.[22]

4.2 Rajas: The Driver of Stress Reactivity

Rajas represents activity, ambition, movement, passion, and emotional excitation. Although moderate Rajas is necessary for motivation and goal-directed behavior, its excessive predominance may lead to restlessness, anxiety, irritability, anger, impulsive behavior, and heightened physiological arousal. Such individuals often perceive stressors more intensely and may demonstrate maladaptive coping mechanisms. Persistent Rajas dominance can therefore contribute to sustained activation of stress-response systems and impaired emotional regulation.[23]

4.3 Tamas: Impaired Adaptation and Reduced Coping Capacity

Tamas is associated with inertia, ignorance, mental dullness, lack of motivation, emotional withdrawal, and reduced awareness. While an appropriate degree of Tamas contributes to rest and recovery, excessive predominance interferes with cognition, decision-making, and adaptive behavior. Individuals with dominant Tamas may exhibit avoidance, helplessness, depressive tendencies, and poor stress tolerance. Such characteristics limit effective psychophysiological adaptation and may increase susceptibility to chronic stress-related disorders.[24]

Table 4.1. Characteristics of Triguna and Their Influence on Stress Physiology

Guna	Dominant Characteristics	Response to Stress	Adaptive Outcome
Sattva	Clarity, wisdom, emotional stability, compassion	Calm appraisal and adaptive coping	High resilience and psychological well-being

Rajas	Activity, ambition, restlessness, passion	Hyper-reactivity and emotional instability	Increased anxiety and physiological arousal
Tamas	Inertia, lethargy, ignorance, withdrawal	Passive or avoidant coping	Reduced resilience and impaired adaptation

4.4 Dynamic Interaction of Triguna During Stress

The three Guna do not function independently; rather, they continuously interact to regulate mental processes. Under normal conditions, a balanced predominance of Sattva maintains psychological harmony, whereas excessive Rajas or Tamas disrupts emotional and cognitive stability. Stressful life events may transiently increase Rajas, which, if unresolved, can gradually progress to Tamas, resulting in emotional exhaustion and reduced adaptive capacity. Restoration of Sattva through appropriate lifestyle, diet, and behavioral interventions is therefore considered fundamental for maintaining psychophysiological equilibrium.[25]

Table 4.2. Proposed Correlation Between Triguna and Modern Psychological Attributes

Triguna	Modern Psychological Correlate	Common Stress Response
Sattva	Emotional regulation, mindfulness, resilience	Adaptive coping and recovery
Rajas	Hyperarousal, impulsivity, emotional reactivity	Anxiety, anger, sympathetic activation
Tamas	Low motivation, cognitive impairment, withdrawal	Depression, avoidance, poor coping

Emerging evidence from integrative psychology suggests that Sattva-dominant individuals are more likely to employ adaptive coping strategies, whereas predominance of Rajas and Tamas is associated with maladaptive emotional responses and ineffective stress management. These observations support the Ayurvedic view that the balance of Triguna is a key determinant of psychophysiological adaptation. Understanding this relationship provides a conceptual bridge between classical Ayurvedic psychology and contemporary stress physiology, thereby offering opportunities for personalized approaches to stress assessment and management.[26]

5. Role of Dosha in Psychophysiological Adaptation

The concept of Dosha forms the functional basis of Ayurvedic physiology and plays a pivotal role in maintaining psychophysiological homeostasis. According to Ayurveda, the balanced state of Vata, Pitta, and Kapha ensures normal physiological and psychological functioning, whereas their imbalance predisposes an individual to disease. During exposure to stress, adaptive responses are influenced by the inherent constitution (Prakriti) and the dynamic state of Dosha, resulting in individual variations in stress perception, coping ability, and resilience.[27]

5.1 Vata and Neural Regulation

Vata is the principal regulator of movement, neural transmission, sensory perception, and autonomic functions. It governs communication between the body and mind and initiates rapid adaptive responses to environmental stimuli. Aggravation of Vata during prolonged psychological stress may manifest as anxiety, fear, insomnia, restlessness, and impaired concentration. These manifestations closely resemble autonomic dysregulation and sympathetic overactivity described in modern stress physiology.[28]

5.2 Pitta and Neuroendocrine Regulation

Pitta governs metabolism, cognition, hormonal activity, and cellular transformation. It facilitates appropriate decision-making and intellectual functions under normal conditions. However, excessive psychological stress may aggravate Pitta, leading to irritability, anger, frustration, hyperacidity, and inflammatory responses. These observations suggest a functional correlation between Pitta imbalance and neuroendocrine activation during chronic stress.[29]

5.3 Kapha and Stress Resilience

Kapha provides structural stability, nourishment, endurance, and emotional steadiness. It contributes to recovery following stressful experiences by promoting calmness and physiological stability. Nevertheless, excessive Kapha may lead to lethargy, emotional withdrawal, reduced motivation, and diminished adaptability. Thus, balanced Kapha supports resilience, whereas its imbalance may impair psychological flexibility.[30]

Table 5.1. Functional Role of Dosha in Stress Physiology

Dosha	Major Physiological Role	Manifestation During Imbalance	Possible Modern Correlation
Vata	Neural communication, movement, autonomic regulation	Anxiety, insomnia, fear, restlessness	Sympathetic activation, autonomic dysregulation
Pitta	Metabolism, cognition, endocrine regulation	Anger, irritability, inflammation	HPA axis activation, cortisol response
Kapha	Stability, nourishment, resilience	Lethargy, emotional withdrawal	Reduced adaptability, recovery mechanisms

5.4 Integrated Role of Dosha in Stress Adaptation

Stress adaptation depends on the coordinated functioning of all three Dosha. Vata initiates rapid physiological responses, Pitta regulates metabolic and endocrine adjustments, and Kapha facilitates recovery and restoration of homeostasis. Disturbance in the equilibrium of these

regulatory principles compromises adaptive capacity and increases susceptibility to stress-related disorders. Therefore, assessment of Dosha status is fundamental for understanding individual variability in psychophysiological adaptation and forms the basis of personalized stress management in Ayurveda.[31]

6. Interplay of Triguna, Dosha, and Psychophysiological Adaptation

Psychophysiological adaptation refers to the integrated ability of the nervous, endocrine, immune, and psychological systems to respond effectively to internal and external stressors while maintaining physiological equilibrium. Ayurveda explains this adaptive capacity through the coordinated interaction of Triguna and Dosha. Whereas Triguna governs psychological attributes and behavioral responses, Dosha regulates physiological functions. The harmonious interaction between these two regulatory systems determines an individual's resilience, coping ability, and susceptibility to stress-related disorders. Thus, adaptation is not merely a biological phenomenon but the result of continuous interactions between mental and somatic regulatory mechanisms.[32]

6.1 Functional Relationship between Triguna and Dosha

Although Triguna and Dosha represent distinct physiological concepts, they function in close coordination. Triguna primarily influences cognition, emotions, motivation, perception, and behavior, whereas Dosha regulates neural activity, metabolism, circulation, tissue nourishment, and homeostasis. Alterations in mental attributes can influence Dosha balance, while disturbances in Dosha may simultaneously affect emotional and cognitive functions. This bidirectional relationship explains why psychological stress often manifests with physical symptoms and why chronic systemic disorders frequently influence mental health.[33]

Table 6.1. Functional Interaction between Triguna and Dosha

Triguna	Primary Mental Function	Predominant Influence on Dosha	Expected Stress Response
Sattva	Clarity, emotional stability, discrimination	Maintains equilibrium of all Dosha	Adaptive coping and rapid recovery
Rajas	Activity, passion, emotional reactivity	Primarily aggravates Vata and Pitta	Anxiety, irritability, hyperarousal
Tamas	Inertia, ignorance, withdrawal	Predominantly aggravates Kapha	Poor motivation, emotional withdrawal, impaired adaptation

The interaction between Triguna and Dosha is dynamic rather than static. Under physiological conditions, Sattva supports appropriate regulation of Vata, Pitta, and Kapha, thereby

maintaining psychophysiological stability. During exposure to persistent stress, increased Rajas may initially stimulate Vata and Pitta, producing heightened autonomic activity, emotional excitability, and metabolic acceleration. If stress remains unresolved, prolonged psychological exhaustion may eventually increase Tamas, resulting in reduced motivation, cognitive fatigue, and diminished adaptive capacity. This sequential progression provides a comprehensive Ayurvedic explanation for the transition from acute adaptation to chronic maladaptation.[34]

6.2 Triguna, Dosha, and Individual Variability in Stress Response

One of the distinguishing features of Ayurveda is its emphasis on individualized physiology. Individuals exposed to identical stressors frequently exhibit markedly different emotional and physiological responses because their Prakriti, Triguna, and Dosha composition differ. A person with predominant Sattva generally demonstrates emotional stability, effective decision-making, and efficient recovery following stressful events. In contrast, dominance of Rajas is associated with heightened emotional reactivity, whereas predominance of Tamas may reduce motivation and impair adaptive behavior. Similarly, variations in Dosha influence physiological manifestations of stress, contributing to differences in autonomic activity, endocrine responses, sleep patterns, and metabolic adaptation.[35]

Table 6.2. Influence of Triguna and Dosha on Psychophysiological Adaptation

Dominant Factor	Psychological Characteristics	Physiological Adaptation	Stress Susceptibility
Sattva + Balanced Dosha	Emotional stability, optimism, self-control	Efficient autonomic and metabolic regulation	Low
Rajas + Vata–Pitta aggravation	Anxiety, irritability, impulsivity	Increased sympathetic activity and endocrine activation	Moderate to High
Tamas + Kapha aggravation	Apathy, withdrawal, reduced motivation	Slower physiological recovery and reduced adaptability	High

These observations indicate that psychophysiological adaptation is a multidimensional process governed by the continuous interaction between mental attributes and physiological regulators. Unlike conventional biomedical models that primarily emphasize neuroendocrine mechanisms, Ayurveda integrates psychological constitution (Triguna) with functional physiology (Dosha), thereby providing a personalized framework for understanding stress adaptation. This integrative perspective may facilitate the development of individualized preventive and therapeutic strategies aimed at enhancing resilience and maintaining long-term health.[36]

6.3 Neurophysiological Correlation of Triguna and Dosha

Recent advances in psychoneuroendocrinology have provided opportunities to interpret classical Ayurvedic concepts through contemporary physiological perspectives. Although Triguna and Dosha cannot be considered direct equivalents of specific biological structures or molecules, their functional attributes exhibit conceptual similarities with several neurophysiological processes. Sattva is associated with emotional regulation, cognitive flexibility, and adaptive coping, characteristics that resemble balanced autonomic regulation and efficient prefrontal cortical functioning. In contrast, excessive Rajas is characterized by heightened arousal, emotional instability, and increased physiological reactivity, whereas excessive Tamas is associated with reduced cognitive activity, diminished motivation, and impaired behavioral responses.[37]

Similarly, the functional attributes of Dosha demonstrate conceptual parallels with physiological regulatory systems. Vata governs neural communication, sensory perception, movement, and autonomic regulation; Pitta regulates metabolic activity, endocrine function, and cellular transformation; whereas Kapha maintains structural integrity, tissue nourishment, and physiological stability. During stress, coordinated interaction among these regulatory principles determines the efficiency of adaptation and recovery. Although these correlations remain theoretical, they provide a valuable framework for interdisciplinary research integrating Ayurveda with neuroscience and stress physiology.[38]

Table 6.3. Conceptual Correlation Between Ayurvedic Principles and Modern Stress Physiology

e	Major Function	Possible Modern Physiological Correlation
Sattva	Emotional stability, discrimination	Psychological resilience, executive control, adaptive coping
Rajas	Activity, emotional excitation	Sympathetic activation, heightened stress reactivity
Tamas	Inertia, withdrawal	Reduced motivation, cognitive slowing, maladaptive coping
Vata	Neural communication, movement	Autonomic nervous system, neural signaling
Pitta	Metabolism, transformation	Neuroendocrine regulation, metabolic activity
Kapha	Stability, nourishment	Recovery, tissue maintenance, physiological resilience

6.4 Integrated Model of Psychophysiological Adaptation

Ayurveda considers stress adaptation as a dynamic process resulting from the interaction of psychological attributes and physiological regulatory mechanisms. Environmental or internal stressors are first perceived by Manas, where their interpretation is influenced by the predominance of Triguna. The resulting psychological response subsequently affects the functional state of Dosha, leading to physiological adjustments that determine adaptation or maladaptation. When Sattva predominates and Dosha remain balanced, adaptive responses are efficient, promoting recovery and maintenance of homeostasis. Conversely, persistent predominance of Rajas or Tamas, accompanied by Dosha imbalance, may impair adaptive mechanisms and increase susceptibility to stress-related disorders.[39]

This integrative model highlights the importance of individualized physiology in Ayurveda. Unlike reductionist approaches that primarily emphasize isolated biochemical pathways, Ayurveda recognizes stress adaptation as the outcome of coordinated interactions among mental, physiological, behavioral, and environmental factors. Such a systems-based perspective aligns with contemporary concepts of personalized medicine and supports the development of individualized preventive and therapeutic interventions aimed at enhancing resilience and preserving health.[40]

Figure 6.1. Proposed Integrative Model of Psychophysiological Adaptation

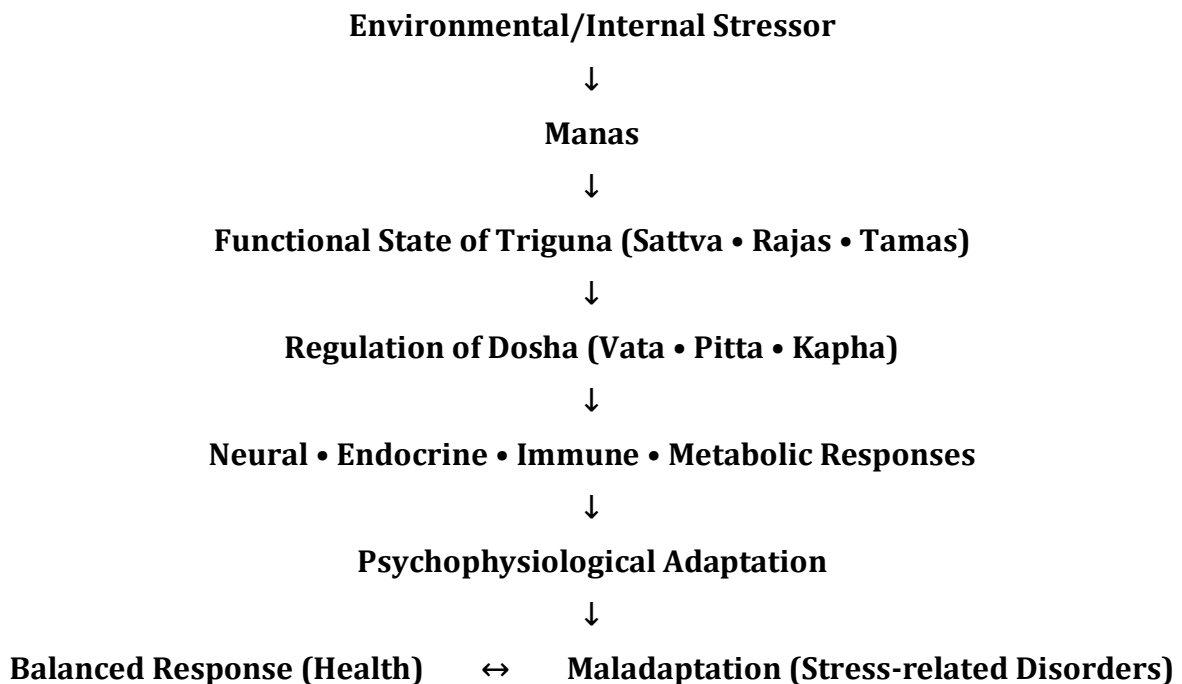


Table 6.4. Adaptive and Maladaptive Outcomes Based on Triguna–Dosha Interaction

Triguna–Dosha Status	Psychophysiological Response	Expected Outcome
Predominant Sattva with balanced Dosha	Efficient emotional regulation and physiological adaptation	Health, resilience, rapid recovery

Increased Rajas with Vata–Pitta aggravation	Hyperarousal, anxiety, irritability	Reduced stress tolerance
Predominant Tamas with Kapha aggravation	Emotional withdrawal, reduced motivation, impaired adaptation	Chronic stress and poor resilience
Balanced Triguna with balanced Dosha	Stable neurophysiological regulation	Optimal psychophysiological homeostasis

Overall, the interplay between Triguna and Dosha provides a comprehensive framework for understanding stress physiology from an Ayurvedic perspective. By integrating psychological constitution with physiological regulation, Ayurveda offers a personalized model of psychophysiological adaptation that complements contemporary concepts of stress biology and supports future translational research in integrative medicine.[41]

7. Ayurvedic Strategies for Enhancing Psychophysiological Adaptation

Ayurveda emphasizes that successful stress management extends beyond symptomatic treatment and aims to restore the equilibrium of Triguna, Dosha, Agni, and Ojas. Classical Ayurvedic principles advocate a holistic approach that combines psychological, behavioral, dietary, and rejuvenative interventions to improve adaptive capacity. These strategies not only alleviate psychological distress but also promote resilience, optimize physiological functions, and maintain long-term health.[42]

7.1 Satvavajaya Cikitsa

Satvavajaya Cikitsa is the principal psychotherapeutic approach described in Ayurveda for managing disturbances of the mind. It focuses on strengthening Sattva by controlling harmful thoughts, regulating emotions, improving self-awareness, and promoting healthy cognitive and behavioral patterns. Through enhancement of mental discipline and emotional stability, Satvavajaya Cikitsa improves stress tolerance and supports psychophysiological adaptation.[43]

7.2 Acara Rasayana

Acara Rasayana refers to ethical conduct and a healthy lifestyle that promote physical, mental, and social well-being. Truthfulness, compassion, emotional control, regular sleep, respectful behavior, and positive social interactions are considered essential for preserving mental equilibrium. These behavioral principles reduce psychological stress and contribute to sustained physiological homeostasis.[44]

7.3 Yoga, Pranayama, and Dhyana

Yoga, Pranayama, and Dhyana are integral components of Ayurvedic health promotion. Regular practice improves autonomic balance, enhances emotional regulation, reduces sympathetic overactivity, and promotes parasympathetic dominance. Clinical studies have demonstrated improvements in perceived stress, heart rate variability, sleep quality, anxiety, and overall

psychological well-being following these interventions, highlighting their role in enhancing adaptive resilience.[45]

7.4 Rasayana Therapy

Rasayana therapy aims to preserve Ojas, improve Vyadhiksamatva, delay aging, and enhance physical and mental performance. Classical Rasayana drugs such as Ashwagandha, Guduchi, Amalaki, and Yashtimadhu possess adaptogenic, antioxidant, immunomodulatory, and neuroprotective properties. These formulations may improve resilience by modulating neuroendocrine and immune responses during chronic stress.[46]

Table 7.1. Ayurvedic Interventions for Enhancing Psychophysiological Adaptation

Intervention	Primary Ayurvedic Action	Expected Physiological Benefit
Satvavajaya Cikitsa	Enhances Sattva and emotional regulation	Improved coping ability and psychological resilience
Acara Rasayana	Promotes healthy conduct and mental discipline	Reduced stress and improved well-being
Yoga	Harmonizes body and mind	Improved autonomic balance and flexibility
Pranayama	Regulates Prana and respiration	Reduced sympathetic activity and improved HRV
Dhyana	Improves concentration and mental calmness	Reduced anxiety and enhanced cognitive function
Rasayana	Nourishes Ojas and supports Vyadhiksamatva	Improved immunity and adaptive capacity

7.5 Dietary and Lifestyle Measures

Ayurveda recognizes Ahara and Vihara as fundamental determinants of psychophysiological health. Consumption of wholesome, freshly prepared, and Sattvika foods, along with regular physical activity, adequate sleep, seasonal adaptation, and maintenance of daily routines (Dinacarya), contributes to balanced Dosha and promotes emotional stability. Conversely, unhealthy dietary habits, irregular routines, and excessive sensory stimulation may aggravate Rajas and Tamas, thereby reducing adaptive capacity and increasing vulnerability to stress.[47]

Table 7.2. Lifestyle Factors Influencing Stress Adaptation in Ayurveda

Lifestyle Factor	Recommended Practice	Expected Outcome
Diet (Ahara)	Fresh, balanced, Sattvika food	Stable metabolism and mental clarity

Daily regimen (Dinacarya)	Regular sleep, exercise, and routine	Improved physiological homeostasis
Seasonal regimen (Rtucarya)	Lifestyle modifications according to season	Better environmental adaptation
Mental discipline	Positive thinking and emotional regulation	Enhanced resilience and stress tolerance

Collectively, these interventions demonstrate that Ayurveda adopts a multidimensional strategy for stress management by integrating psychological counseling, behavioral modification, lifestyle regulation, rejuvenative therapy, and mind–body practices. Rather than focusing solely on symptom relief, these approaches aim to strengthen adaptive capacity, preserve physiological homeostasis, and promote holistic well-being, thereby offering a comprehensive framework for the prevention and management of stress-related disorders.[48]

Conclusion

Stress is a multifaceted psychophysiological process that requires coordinated regulation of neural, endocrine, immune, and behavioral systems to maintain homeostasis. While modern physiology explains stress primarily through neuroendocrine and autonomic mechanisms, Ayurveda offers a broader perspective by integrating the functional interplay of Triguna, Dosha, Manas, and Ojas in maintaining psychophysiological balance.

The present review highlights that Triguna influences psychological attributes, emotional regulation, and adaptive behavior, whereas Dosha governs physiological responses essential for stress adaptation. Their dynamic interaction determines individual differences in stress perception, coping capacity, and resilience. Disturbances in these regulatory principles may impair adaptation and increase susceptibility to stress-related disorders.

Ayurvedic interventions, including Satvavajaya Cikitsa, Acara Rasayana, Yoga, Pranayama, Dhyana, and Rasayana, provide a holistic and personalized approach for enhancing resilience and restoring psychophysiological equilibrium. Integrating these classical concepts with contemporary stress physiology may improve our understanding of individual variability in stress responses and support the development of evidence-based, personalized strategies for stress prevention and management. Further multidisciplinary research is warranted to scientifically validate these concepts and strengthen their application in integrative healthcare.

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