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Journal of Natural & Ayurvedic Medicine
ISSN: 2578-4986

The Ayurvedic Model of Perception and Its Neuroanatomical Correlates: A Conceptual Review

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Review Article

Volume 10 Issue 4

Received Date: September 10, 2026

Published Date: October 01, 2026

DOI: 10.23880/jonam-16000469

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Abstract

According to Ayurveda, there is a sequence and a programme in the perception of knowledge (Jnana) in the form of structured model. The sense organs (Indriya), the objects (Artha) of the sense organs, the mind (Manas) and the intellect (Buddhi). Combining the Ego principle (Ahankara) with consciousness (Atma) transform (Chitta & Smriti). Making sense of sensory contact. Neuroscience has developed in isolation to a contemporary state. Detailed description of the process of sensation to perception beginning at the receptors. The second one is primary sensory cortex, thalamus, association cortex, prefrontal. The executive networks, the limbic memory circuits and the midline structures of self-reference. This Conceptual review is a combination of these two traditions. Classical descriptions of Indriya, the Charaka Samhita, Sushruta Samhita, Bhela, Manas, Buddhi, Chitta, Ahankara are drawn based on Charaka Samhita. Samhita and commentarial literature is discussed in the context of contemporary neuroanatomical studies and neuro-developmental evidence. It is suggested that Indriya is a peripheral receptor. Primary sensory cortices to the thalamus and modality-specific association cortices; Buddhi to prefrontal executive network, Chitta with limbic memory-emotion circuits and the Ahankara is a multi-layered self-system: brainstem nuclei and default mode of the cortex network. The classical account of month wise fetal development (*Garbha Vruddi*) is then compared with the maturation of these systems, with the described consciousness of Manas in the fifth gestational month set alongside the documented onset of thalamocortical connectivity. These correlations are expressed as interpretative hypotheses and not equivalences, made for integrative research questions to test at the interface of Ayurveda and neuroscience.

Keywords: Ayurveda; Perception; Indriya; Manas; Buddhi; Ahankar; Antahkarana; Thalamus; Garbha Vruddhi; Neuroanatomy

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Introduction

Understanding how a living being comes to know its world is a question that has occupied both classical Indian thought and modern science. Ayurveda approaches this question through a structured model of knowledge perception. According to classical description, when the sense organs (Indriya) are associated with the mind, they come into contact with their respective objects (Artha) [1]. The mind then evaluates the object in terms of its qualities, forms a determination (Sankalpa or Druda Nischaya), and only then does a person become capable of speaking or acting consciously and purposefully (Buddhipurvaka). When consciousness (Atma), mind (Manas), the sense organs (Indriya), and the sense objects (Artha) come into proper contact, the clear knowledge that results is called Pratyaksha, or direct perception [2]. This sequence rests on a set of interdependent faculties. The five sense organs (Jnanendriya) - the eye, ear, nose, tongue, and skin - form the interface between the external world and the individual. Mere contact between a sense organ and its object, however, does not by itself produce knowledge; the mind (Manas) must connect with the sensory input before perception can occur. The intellect (Buddhi) discriminates, judges, and decides. Memory and impression, described through the qualities of Smriti and Samskara, allow experience to be recorded and recalled. The ego principle (Ahankara) generates the sense of individual "I-ness" to which experience is felt to belong. Consciousness (Atma) underlies the entire process.

Modern neuroscience has, through an independent line of enquiry, arrived at a comparably layered account of how sensation becomes knowledge: transduction at specialised receptors, relay and gating through the thalamus, elaboration in primary and association cortices, evaluation by prefrontal-limbic networks, and integration into a self-referential frame supported by midline cortical structures and brainstem nuclei. The developmental timeline of these systems-broadly, brainstem and thalamic structures maturing before association cortices, which in turn mature before prefrontal and default-mode networks-is also increasingly well characterised.

The attempt to relate Ayurvedic psychology to modern neuroscience is not a new one. Much of the descriptive groundwork was laid by Rao's survey of the concept of mind in Ayurveda, and subsequent conceptual studies have considered individual faculties, such as Buddhi, in relation to contemporary constructs of intelligence.Rarely has a systematic, faculty-by-faculty mapping been attempted that assigns correlates at named cortical and subcortical levels, extends the comparison to developmental timing, and states the resulting correspondences in a form specific enough to generate testable predictions.

This conceptual review brings these two independently developed frameworks into dialogue. It examines classical descriptions of Indriya, Artha, Manas, Buddhi, Chitta, and Ahankara and proposes plausible modern neuroanatomical correlates for each, extending the comparison to the Ayurvedic account of month-wise fetal development (Garbha Vriddhi). The aim is not to claim equivalence between two very different explanatory systems, but to demonstrate that they may describe overlapping aspects of the same underlying phenomenon from different vantage points, and to identify where this comparison generates testable questions for future interdisciplinary research.

Sources and Approach

The classical material was taken from the Charaka Samhita (Sutra Sthana, Sharira Sthana), the Sushruta Samhita (Sharira Sthana), and the Bhela Samhita, and was consulted in the editions listed in the references. Where classical sources are in disagreement on a point, the disagreement is stated, not resolved by choice. PubMed and Google Scholar were searched for neuroscientific literature by combining each faculty's functional description with relevant anatomical and physiological terms (e.g., thalamus and sensory gating; association cortex and agnosia; default mode network and self-referential processing). Articles reviewing and primary sources establishing a functional role of a structure were preferred. Sources were chosen for their relevance to the correspondences being proposed. No systematic review protocol was followed and this review makes no claim to cover the literature exhaustively.

The Classical Framework of Knowledge Perception

Indriya and Artha

Artha refers to the external object or stimulus perceived by a corresponding sense organ, and includes sensory qualities such as Rupa (form), Shabda (sound), Sparsha (touch), Rasa (taste), and Gandha (smell); it represents the physical property - vibration, texture, or pressure - that exists prior to its detection by the body [3]. The five Jnanendriya - Chakshu (eye), Sahotra (ear), Ghrana (nose), Jihva (tongue), and Tvak (skin) - are the organs responsible for perceiving these respective objects [4]. These organs initiate the process of perception, but mere contact between an Indriya and its Artha does not by itself yield knowledge: Manas must establish a connection with the specific Indriya before perception occurs. Because Manas is considered atomic (Anu) and indivisible, it can attend to only one Indriya at a time, which classical texts offer as the explanation for why conscious attention is directed toward a single sensory modality at any given moment?

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Manas

Manas is regarded as the eleventh sense organ (Ekadasendriya), described asUbhayatmaka because it serves both the sensory (Jnanendriya) and motor (Karmendriya) systems [5].It is described as a subtle (Atindriya) internal faculty, also termed Sattva or Cetas, that connects Atma, the Indriya, and the body, regulates sensory function, enables the experience of emotions such as happiness and sorrow, and supports cognition [4]. Classical embryology states that during the fifth month of gestation, Manas becomes Pratibuddhataram(manifested), more functionally awakened, understood to describe increasing functional expression rather than the origin of Manas at that point [6]. The Bhela Samhita locates Manas in the region between the head (Shira) and the palate (Talu) [7], and describes it as closely associated with the Indriya, coordinating and regulating their activity. Manas is also described as engaging in five categories of cognitive activity (Manasa Vishaya): Chintya (recollection of experience), Vicharya (evaluation of merits and defects), Uhya (inference and reasoning), Dhyeya (focused contemplation), and Sankalpya (determination)[8]. In addition, Manas directly experiences internal states such as Sukha (happiness) and Duhkha (sorrow), independent of the external sense organs [9]. Two further functions are attributed to it: Indriyabhigraha, the control and direction of sensory attention, and Svasya Nigraha, self-regulation of thought, emotion, and action [10]. Manas is thus described as the coordinating faculty linking the sense organs to conscious awareness, attending to only one Indriya at a time [11].

Buddhi

Buddhi is described as the faculty of decision-making (Nishchayatmaka), which together with Manas produces affirmation (Druda Sankalpa). The Charaka Samhita positions Manas, Buddhi, and the cognitive-conative organs as the instruments (Karana) through which the experiencing self (Purusha) comes to know and act, their association with the self-producing sensation, action, and understanding [12]. Buddhi is described as operating beyond the jurisdiction of Manas: Manas merely governs attending or not attending to sensory contact, while ascertainment and judgement belong to the separate jurisdiction of Buddhi [13]. Later Ayurvedic scholarship distinguishes Panchendriya Buddhi, intellect operating on live sensory input, from Mano Buddhi, intellect operating on internally generated mental content without concurrent external stimulation [14].

Chitta

Chitta as a distinct fourth component of the Antahkarana, alongside Manas, Buddhi, and Ahankara, is not used as a separately defined technical term in the Charaka Samhita; this four-part formulation belongs primarily to the Yoga and Samkhya traditions, notably Patanjali's Yoga Sutra and its Vyasa Bhashya commentary [15]. Charaka's own psychological framework centres on Manas, Buddhi, and Ahankara, supplemented by qualities of the self-including Smriti (memory) and Samskara (mental impression) [16], which functionally overlap with what Yoga psychology attributes to Chitta as the retention and impression-storing substrate from which memory and habitual tendency arise.

Ahankara

Ahankara is a Sanskrit compound of Aham ("I") and Kara, from the root Kri ("to make"), yielding the sense of "I-maker" or the principle of self-realisation and self-awareness [17]. The Charaka Samhita situates Ahankara within the twenty-four Tattva (Chaturvinshati Tattvatmaka Purusha) that constitute the experiencing Purusha, following a Samkhya-derived scheme in which Ahankara emerges from Mahat (cosmic intellect), which in turn emerges from Avyakta (the unmanifest) [18]. Within this scheme, Ahankara is the principle of individuation through which undifferentiated intellect particularises into a sense of separate identity, from which the sense organs, mind, and subtle elements subsequently arise. Although Charaka offers no standalone definitional verse for Ahankara as he does for Manas and Buddhi, its inclusion as a distinct Tattva affirms that Ayurveda inherits this Samkhya function.

Proposed Neuroanatomical Correlates

The human brain, with its approximately 86 billion neurons [19] and their synaptic connections, provides the substrate through which sensation is transduced, relayed, elaborated, and ultimately experienced as knowledge [20]. The sections below examine plausible correlates for each Ayurvedic faculty against this substrate.

Indriya and Artha: Peripheral Transduction and the Primary Sensory Cortex

In contemporary sensory physiology, a stimulus is a form of physical or chemical energy capable of activating a specialised receptor: light as electromagnetic energy, sound as mechanical pressure waves, and touch as mechanical defo rmation, taste as soluble chemical compounds, and smell as volatile molecules. Specialised receptors convert these forms of energy into electrical signals through sensory transduction, each system responding preferentially to its own adequate stimulus. Indriya-Artha may thus be correlated with the stimulus information available in the external or internal environment, and the Jnanendriya with the specialised receptor systems - photoreceptors, cochlear hair cells, cutaneous mechanoreceptors, taste receptor cells,

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and olfactory receptor neurons - that detect them.

Classical Samkhya and Ayurvedic thought divides Indriya into the five Jnanendriya (organs of cognition) and five Karmendriya (organs of action: speech, hands, feet, excretion, and reproduction), together forming an afferent-efferent interface between the body and the deeper faculties of Manas and Buddhi. This bidirectional organisation maps onto the ascending and descending pathways of the nervous system. Ascending pathways, driven by distinct subpopulations of spinal projection neurons, carry mechanical, thermal, chemical, and nociceptive information from the periphery to multiple brain regions involved in perception, emotion, and cognition, functionally paralleling the Jnanendriya's role in relaying sensory contact inward [21]. Descending pathways - corticospinal, corticobulbar, and propriospinal - transmit motor commands outward, mirroring the efferent role of the Karmendriya. This organisation is reciprocal and notone-directional: if one pathway is damaged or malformed, the other is similarly damaged or malformed, or in keeping with an integrated sensorimotor loop and not two separate channels [22].

Indriya is not limited to the periphery organs, as suggested by a closer reading of the classical texts, but penetrates the primary sensory cortices, the areas of the cortex where the sensation is first registered but not yet interpreted. Each Jnanendriya can be mapped onto its corresponding primary cortical area (Table 1): touch to the postcentral gyrus [23], vision to the primary visual cortex [24], hearing to Heschl's gyri [25], taste to the parietal operculum and insula [26], and smell to the piriform and entorhinal cortex [27]. Voluntary movement, a Karmendriya function, is initiated from the primary motor cortex [28]. These primary areas register sensation faithfully but do not identify, name, or understand it: a hand touching silk and a hand touching sandpaper generate distinct cortical activity, but the object's identity is not represented at this level. This is consistent with the classical description of Indriya as the faculty that perceives without analysing - sensation is the raw detection of a stimulus, and its meaningful interpretation, perception proper, belongs to Manas and Buddhi (Table 1).

Indriya	Artha (object)	Primary cortical correlate
Tvak (touch)	Sparsha	Postcentral gyrus (BA 3, 1, 2)
Chakshu (vision)	Rupa	Primary visual cortex (BA 17)
Shrotra(hearing)	Shabda	Heschl's gyri (BA 41, 42)
Jihva (taste)	Rasa	Parietal operculum / insula (BA 43)
Ghrana (smell)	Gandha	Piriform / entorhinal cortex (BA 27, 34)

Table 1: Indriya and their proposed primary cortical correlates.

Manas: Thalamic Relay and Association Cortices

The Bhel Samhita's description of Manas as situated between the head and palate points towards a central, cranial location. The cranial site is the more anatomically plausible of the two classical views, as discussed below. The thalamus is located near the third ventricle and is an important relay and integration centre for sensory information. This interpretation would be most consistent with the thalamus. Almost all the sensory input (except smell) passes through thalamic nuclei before reaching the cortex, where it is gated and filtered based on behavioural relevance [29,30]. This is a gating that is a mixture of the driving inputs that maintains the main content of the behavioural sensory signals and modulatory inputs from cortical feedback and brainstem systems, which shapes and ultimately reaches conscious processing. Beyond simple relay, higher-order thalamic nuclei areas of the brain, such as the pulvinar and mediodorsal nucleus, play an active role in attention, working memory, and the connectivity of cognition in distributed cortical networks, functions as a communication hub not a passive waystation [31]. These integrative functions are like the classical functions assigned to Manas (Indriyabhigraha, Uhya, Vicharya and Sankalpa). With this it makes the thalamus a plausible correlation for Manas-Sthan. It has also been claimed that in the classical text, knowledge cannot be generated without Manas. This also finds support in the distinction between the primary and the association cortices. If the primary sensory pathway is intact but if the matching association cortex is impaired, in this case perception can only be at the level of raw without making it significant knowledge [32]. In visual agnosia, a person may see clearly yet fail to recognise what is seen, when visual association areas are affected [33]. In astereognosis, an object can be felt but not identified, typically due to damage in somatosensory association areas [34]. In Wernicke's aphasia, sounds are heard but not understood, involving auditory association cortex [35]. Damage to olfactory or premotor association regions similarly impairs odour identification or purposeful action planning [36]. Each modality-specific association area therefore appears to convert the raw signal registered by its primary cortex into something contextualised

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and understood, the neurological counterpart of Manas establishing contact with an Indriya.

The Ayurvedic description of Manas becoming Pratibuddhataram in the fifth gestational month may be functionally correlated with the period in which thalamocortical afferents first organise sensory pathways to the cortex, approximately twenty to twenty-four weeks, a stage of rapid fetal brain maturation rather than the origin of a single anatomical structure [37-39].

Buddhi: The Prefrontal Executive Network

Although no single cortical region can be regarded as the anatomical equivalent of Buddhi, its functions correspond closely to the prefrontal cortex. Functional neuroimaging shows that Brodmann area 10 (frontopolar cortex) supports complex reasoning, planning, prospective memory, and the integration of multiple cognitive processes, while the orbitofrontal cortex (Brodmann area 11) contributes to value-based decision-making, behavioural flexibility, and evaluation of consequences [40]. These executive functions parallel the Ayurvedic description of Buddhi as the faculty that discriminates, analyses, and arrives at a definite conclusion (Nishchaya).

Discriminative judgement in the brain, however, rarely operates in isolation from emotional and motivational context. The prefrontal cortex integrates information relayed from the thalamus and processed by association areas, evaluating it against prior experience and anticipated consequence [41], but this process is continuously shaped by affective weighting from limbic structures such as the amygdala, hippocampus, and cingulate cortex, which project extensively to prefrontal regions [42]. Neurons within the prefrontal-amygdala network encode cognitive and emotional variables jointly within interconnected circuits rather than in isolation. This limbic-prefrontal interplay mirrors the Ayurvedic understanding of Buddhi as operating on impressions and emotional colouring already processed by Manas, rather than as a purely abstract, emotion-free computation.

Chitta: A Limbic Memory-Emotion Substrate

Chitta is classically described as the substrate on which Vrittis (fluctuations) arise, mediating memory (Smriti), emotional colouring (Raga-Dvesha, attachment and aversion), and habitual tendency (Vasana), with Manas, Buddhi, and Ahankara treated in the Vyasa Bhashya commentarial tradition as functional modes of this single underlying Chitta. These attributes correspond closely to the limbic system: the hippocampus, amygdala, cingulate gyrus, and related structures that together mediate memory consolidation, emotional processing, and motivated behaviour. The hippocampus is central to the encoding and retrieval of long-term memory [43], paralleling the Samskara-Smriti function attributed to Chitta, while the amygdala governs the emotional valence and threat or reward appraisal of stimuli [44], corresponding to the Raga-Dvesha colouring classically ascribed to it. The cingulate gyrus further integrates emotional experience with autonomic response [45] and behavioural output, reflecting the way Chitta is described as underlying instinctive and habitual reaction rather than deliberate cognition. Because these limbic structures operate largely beneath the threshold of conscious executive control, modulating behaviour through affect, memory bias, and conditioned association, they parallel the classical description of Chitta as a substratum rather than an active agent. The limbic system may therefore be considered a plausible correlate of Chitta, based on the convergence between its role as an emotional-memory substrate and the classical characterisation of Chitta as the ground of Vrittis.

Ahankara: A Layered Self-System

In Ayurveda, Ahankara represents the sense of “I-ness” and is responsible for self-awareness, individuality, and the perception that experience, thought, and action belong to oneself. Modern neuroscience suggests that a distributed network rather than a single region mediate these functions. The medial prefrontal cortex plays a central role in self-referential thinking and self-evaluation [46], the anterior cingulate cortex is involved in self-monitoring and conflict resolution, and the posterior cingulate cortex participates in autobiographical memory and self-related cognition [47], while the insular cortex integrates interoceptive signals, contributing to the subjective awareness of one’s own body and internal state [48]. These regions form major components of the default mode network, preferentially activated during self-referential cognition and introspection, and may be functionally correlated with Ahankara’s role in generating self-identity and the perception of ownership.

This cortical account, however, addresses only the reflective, autobiographical layer of selfhood. A more primitive, pre-reflective sense of being a distinct experiencing subject, closer to Ahankara’s classical role as the “I-maker” (Asmita) underlying Buddhi’s more elaborate discriminative operations, has been localised not to cortex but to a set of brainstem nuclei, particularly the periaqueductal gray, the parabrachial nucleus, and the nucleus tractus solitarius, proposed as the neural basis of a homeostatic ally grounded “core self” that precedes autobiographical self-awareness [49]. Notably, damage

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confined to the classically "self-related" cortical regions - insula, anterior cingulate, and medial prefrontal cortex - has been shown to leave this core self-awareness intact, whereas damage to the brainstem tegmentum has long been associated with the collapse of consciousness and self-related processing altogether [50]. This suggests a layered organisation in which a subcortical, brainstem-level process generates the primitive sense of "I-ness," while cortical midline structures extend it into autobiographical memory and reflective self-concept, closely paralleling the classical placement of Ahankara as the primitive, self-referential principle upon which Buddhi's discriminative function subsequently operates.

Neurodevelopmental Correlation: Garbha Vriddhi and the Maturation of the Antahkarana

Ayurveda describes fetal development month by month (Masanumasika Garbha Vriddhi) as a sequence in which structures and functions manifest progressively, alongside a parallel, if less granular, account in modern neuroembryology. In the early weeks, the undifferentiated embryo (Kalala, Ghana or Pinda) corresponds to gastrulation and the onset of neurulation, when the neural plate and neural tube begin to form. By the second month, as the body's limbs and parts appear (Sarvanga-pratyanga), the primary and secondary brain vesicles form and cranial nerves begin to appear. By the third month, the Indriya attain manifest form (Sarvendriya-pratyakshata) as peripheral nerves and neuromuscular junctions develop, producing early reflex movement and sensory responsiveness; Ayurveda describes this as the beginning of Manas's functional integration. The fourth month, marked by Shitara (stability) and a more evident Chetana (consciousness), coincides with rapid cortical neurogenesis and thalamic development. The fifth month, in which Manas becomes Pratibuddhataram, aligns with neuronal migration and cortical plate organisation and the establishment of thalamocortical connectivity described above. By the sixth month, something remarkable is quietly unfolding. Ancient commentarial tradition speaks of the initial awakening of Buddhi - the faculty of intelligence and discernment - taking root within the developing being. What modern neuroscience now reveals runs in striking parallel: this is precisely when synaptogenesis accelerates, when thalamocortical projections begin weaving the first threads of functional cortical connectivity, and when the fetus starts genuinely responding to the world beyond the womb - turning toward touch, stirring at the sound of a voice. The seventh month carries a name that feels almost ceremonial – Sarva bhava Sampurnata, the completion of all components. And in a very real sense, it is. This is the threshold of fetal viability, the point at which life outside the womb becomes possible. Science tells a complementary story: organised cortical EEG activity emerges, sleep and waking cycles begin to establish themselves, and the slow, essential process of myelination gets underway - the brain beginning to insulate its own wiring for faster, sharper communication. Then comes the eighth month, and with it, a curious vulnerability. Ayurvedic tradition describes Ojas - the body's vital essence, its deepest reserve of vitality and resilience - as characteristically unstable during this period, as though the developing being is still learning how to hold itself together, still finding its balance on the threshold between formation and readiness. Modern neurology offers a compelling echo: the brain is during explosive synaptogenesis and rapid growth, yet autonomic regulation remains immature. The system is building itself at speed, but the scaffolding isn't fully secured by the ninth month, that instability resolves into readiness. Ancient texts describe complete fetal maturation - every faculty primed every system in place. The neuroscience agrees: the brainstem, cortex, and cerebellum have reached functional maturity, now capable of coordinating the very first acts of independent life like breathing, suckling, reflexive response. Then, birth. Ayurveda marks this moment with profound intentionality, calling it Prana Pratishtha- the establishment of Prana, the activation of the Vayu, the vital winds that animate existence. In biomedical terms, it is the dramatic transition to extrauterine circulation and the assumption of autonomous neural control. Two traditions, worlds apart in language and method, arrive at the same astonishing truth: that the first breath is not merely biological. It is the moment life truly begins to live on its own terms.

These correlations are best read as broad interpretative hypotheses about the sequence and timing of functional maturation, rather than as direct structural equivalences (Table 2). Read together, they suggest that the Antahkarana faculties emerge in a graded sequence that parallels the maturation of their proposed neural correlates: Manas, linked to the thalamus and limbic system, emerges around the fourth to fifth month; Buddhi, linked to the prefrontal and association cortex, begins emerging from the sixth month but continues maturing well into postnatal life, reflecting the protracted development of the prefrontal cortex; and Ahankara, linked to the default mode network, develops mainly during postnatal infancy and childhood, consistent with the comparatively late maturation of this network relative to other brain systems.

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Ayurvedic faculty	Approximate timing (Garbha Vriddhi)	Proposed neural correlate	Modern developmental correlate
Manas	4th-5th month (Manah Pratibuddhata)	Thalamus, limbic system	Onset of thalamocortical connectivity
Buddhi	6th-9th month; major maturation postnatal	Prefrontal and association cortex	Synaptogenesis and thalamocortical projections; protracted postnatal maturation
Chitta/Smriti-Samskara	Late fetal life; postnatal maturation	Hippocampus, medial temporal structures	Gradual maturation of hippocampal memory circuits
Ahankara	Mainly postnatal infancy and childhood	Default mode network, medial prefrontal cortex	Comparatively late maturation of the default mode network

Table 2: Progressive development of the Antahkarana and Proposed neuro-developmental correlates (Chitta is used here in the Yoga–Samkhya sense; Charaka's framework substitutes Smriti and Samskara as qualities of the self)

Discussion

Taken together, the correlations proposed above outline a serial, hierarchical architecture that runs from peripheral receptor to primary cortex (Indriya), through thalamic relay and association cortex (Manas), to prefrontal executive evaluation (Buddhi), with limbic memory-emotion processing (Chitta) and a layered, brainstem-to-cortical self-system (Ahankara) operating throughout. This architecture mirrors the classical sequence in which sensory contact must first pass through Manas before Buddhi can render a definite judgement, and in which the entire process is coloured by memory and felt as belonging to a self.

The correspondence is strongest where the classical descriptions are most anatomically specific - the cranial location attributed to Manas, the primary-versus-association distinction implicit in the claim that Indriya alone cannot yield knowledge, and the serial, one-faculty-at-a-time processing attributed to Manas - and comparatively weaker where the classical texts describe a function, such as discrimination or self-reference, without committing to a location, which is also precisely where modern neuroscience itself struggles to identify a single anatomical seat.

Layered Correlates as a Shared Feature, Not an Inconsistency

Two of the five faculties examined here, Manas and Ahankara, resist a single anatomical assignment and instead map onto more than one level of neural organisation: Manas onto both the thalamus and modality-specific association cortices, and Ahankara onto both a primitive brainstem substrate and a distributed cortical midline network. A superficial reading might treat this as a weakness of the proposed correlations, as though the review were unable to settle on one answer. The more useful reading is the opposite one: this layering is a genuine and expected feature of both explanatory systems, not an artefact of the mapping exercise. In the classical texts, Manas is described simultaneously as a location, between the head and the palate, and as a set of operations (Indriyabhigraha, Uhya, Vicharya, Sankalpya) that are more naturally understood as distributed processes than as the output of a single point in space. Ahankara is described in a similarly layered way: as a location-independent Tattva within the Samkhya scheme, and as the immediate, felt sense of "I-ness" that accompanies experience from moment to moment. Modern neuroscience shows an analogous pattern. Sensory gating is not the exclusive province of the thalamus, and self-representation is not confined to the default mode network; both are better understood as convergence points within a wider, hierarchically organised system that extends from brainstem to cortex. Read this way, the layered correlates proposed for Manas and Ahankara are not competing hypotheses that this review has failed to adjudicate between, but complementary descriptions of the same faculty operating at different levels of the neuraxins.

Textual Heterogeneity and the Question of a Single Seat

The observation that classical sources are not unanimous on the anatomical seat of Manas, cranial in the Bhela Samhita, cardiac in the context of fourth-month fetal development, raises a broader methodological point for correlational work of this kind. Ayurvedic literature developed across centuries, across multiple schools (Charaka, Sushruta, Bhela), and across both medical and philosophical (Samkhya, Yoga, Vedantic) traditions that did not always share a single settled psychology. A correlational review that treats this corpus as a single, internally consistent system risks either suppressing that plurality or being forced to choose one strand of the tradition while silently setting aside another. This review has prioritised the Bhela Samhita's cranial location because it is the more anatomically specific of the two claims and because it aligns with the thalamus's documented role as a sensory relay station, but that is an interpretative choice rather than a resolution of the underlying textual question. The Hridaya-

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centred tradition, in which the heart is regarded as the seat of Manas and of emotional and cognitive life more broadly, has its own long history in Ayurveda and Indian philosophy and deserves separate treatment, rather than being read as a competing but inferior claim. Future correlational work in this area would do well to treat such divergences as a starting point for textual and historical analysis, rather than resolving them by selective citation.

Toward Bidirectional Hypothesis Generation

Most correlational work between Ayurveda and neuroscience proceeds in one direction: a classical concept is described, and a modern anatomical or physiological finding is located that appears to match it. The traffic can, in principle, run the other way. The classical claim that Manas can attend to only one Indriya at a time, for instance, anticipates by many centuries the modern description of attention as a limited-capacity, serial process [51], and invites a more specific, empirically tractable question: whether the thalamic gating mechanisms proposed here as the correlate of Manas are themselves the structures responsible for that serial limitation, or whether the bottleneck instead arises further downstream, in cortical competition for representation. Similarly, the classical description of Indriya as extending inward only as far as the primary sensory cortex offers a testable prediction, that primary cortical activity alone, in the absence of association-cortex engagement, should be systematically dissociable from any reportable percept, a prediction broadly consistent with the lesion evidence reviewed in the preceding section but rarely framed in these explicit terms as a starting hypothesis. Read in this way, the classical model is not simply a target for neuroscientific validation but a potential source of organising questions, generated from centuries of systematic introspective observation rather than from laboratory measurement.

Implications for Integrative Practice and Future Research

If the correlations proposed here hold up to closer scrutiny, they carry implications beyond historical or philosophical interest. For Ayurvedic education and clinical training, an explicit neuroanatomical vocabulary for Indriya, Manas, Buddhi, Chitta, and Ahankara may make classical psychological concepts more accessible to students and practitioners trained primarily in biomedical frameworks, without requiring that either system be reduced to the other. For neuroscience, the classical model's insistence on treating perception, judgement, memory, and self-reference as distinct but sequentially dependent faculties, rather than as a single undifferentiated process of cognition, offers a parsimonious organising scheme that could usefully bring together findings from otherwise disparate subfields: sensory neuroscience, thalamic physiology, prefrontal decision science, limbic memory research, and default mode network studies. Direct empirical tests of the specific correlations proposed here would require purpose-designed studies: functional imaging during tasks that isolate Manas-like gating from Buddhi-like judgement, for example, or developmental imaging cohorts scanned specifically across the fifth gestational month, rather than the broader windows typically used in fetal imaging studies, to test the timing convergence proposed here more precisely than the retrospective alignment offered in this review. Such studies would be substantial undertakings, but the specificity of the correlations proposed, tied to named Brodmann areas, named nuclei, and a named developmental window, means they are not beyond the reach of existing methods.

Ultimately, the convergence between the fifth-month emergence of Manas and the documented onset of thalamocortical connectivity remains the single most striking point of correspondence identified in this review, since both traditions independently identify a comparable developmental window using entirely different methods of observation: one through systematic introspection and embryological description recorded over centuries, the other through modern imaging and histological study. Such timing convergences, together with the anatomical correlations proposed for Indriya, Buddhi, Chitta, and Ahankara, are offered as a structured basis for hypothesis generation rather than as confirmed equivalences between two conceptually distinct systems. Whether this convergence reflects a genuine, shared substrate that both traditions have, in their own ways, correctly identified, or a more limited correspondence that owes something to the flexibility of interpretation available when mapping a philosophical vocabulary onto a complex organ, is a question this review can raise but not settle.

Limitations

This review is more interpretive and conceptual than purely empirical. It is based on structural and functional descriptions of various classical sources and neurophysiological research, but it is not a conclusive proof that the connections suggested work in practice. We can't claim the relationship between the two frameworks is settled - a single brain region may do far more than one classical function suggests, and vice versa. The correlations we discuss here are therefore better seen as starting points for investigation rather than final answers.

Classical sources do not all agree on several key points. Most contentiously, scholars disagree on the precise meaning of terms like Manas and Buddhi, and this review does not pull punches on this inconsistency. The sources we have selected are relevant to the specific links we are investigating

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and are not intended to be a comprehensive or systematic review of the literature. A more rigorous methodological approach, based on a wider and more carefully mapped body of evidence, would considerably strengthen the case and leave less room for debate.

Conclusion

The classical Ayurvedic account of knowledge and perception and the modern neuroscientific account of sensory processing originate in different periods and rest on different methods, yet they describe a comparable graded architecture: a progression from raw sensory contact to interpreted, self-attributed knowledge. Set side by side, several correspondences emerge. Indriya corresponds to peripheral receptors and the primary sensory cortices, the first point of contact between environment and nervous system. Manas corresponds to thalamic relay and the modality-specific association cortices, where registered signal is organised into recognised content. Buddhi corresponds to the prefrontal executive network, which supports discrimination and determination. Chitta corresponds to limbic memory-emotion circuits. Ahankara corresponds to a layered self-system extending from brainstem nuclei to the cortical default mode network. The correspondence extends beyond structure to developmental timing, with both frameworks identifying a comparable transition around the fifth gestational month.

None of this establishes equivalence. Ayurvedic categories were not formulated as descriptions of neuroanatomical structures, and the correspondences proposed here are interpretative hypotheses. Their value lies in their specificity: tied to name Brodmann areas, named nuclei and a named developmental window, they yield the predictions stated above, which are testable by existing methods. Whether the convergence reflects a shared substrate that both traditions have identified by different means, or a looser correspondence attributable to the interpretative latitude available when mapping a philosophical vocabulary onto a complex organ, is a question this review raises but cannot settle.

Conflict of Interest

The authors declare no conflict of interest.

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