

# Structural-Constructivist Foundations of the Core Emotion Framework: A Multi-Scale Synthesis of Neurobiological, Somatic, and Cognitive Evidence

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## Abstract

The Core Emotion Framework (CEF) proposes a structural-constructivist architecture of human emotion built on three biologically grounded hubs—the Head, Heart, and Gut—each composed of distinct functional operators that together form a “Human Operating System.” The framework synthesizes evidence from affective neuroscience, polyvagal theory, somatic psychotherapy, and cognitive construction models to show that emotions are dynamic transformations rather than fixed categories. The cephalic, cardiac, and enteric nervous systems provide the anatomical substrate for these hubs, each capable of sensing, learning, and influencing perception independently. As the manuscript states, the CEF “models the human internal landscape as a functional operating system composed of ten discrete operators” and treats the three hubs as “distinct functional processors that must be aligned and integrated to achieve psychological flourishing.” Emotional Cycling protocols operationalize this architecture through bilateral integration, midline crossing, and somatic grounding to restore operator independence and prevent fusion. By aligning with predictive processing and interoceptive models of emotion, the CEF offers a unified framework for psychotherapy, somatic practice, and computational modeling, reframing emotional processes as modular, trainable transformations.

### KEYWORDS:

Core Emotion Framework (CEF); structural-constructivist model; emotional operators; tripartite

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*\*) We welcome feedback on the preregistration and study design, and invite researchers who are interested in peer-reviewing the system to contact us. We also encourage scholars across all disciplines to conduct their own independent research on any aspect of the Core Emotion Framework. Author assumes no societal or substantial gains from this framework, just for public and academic service.*

neurobiological hubs; interoception and allostasis; polyvagal regulation; somatic grounding; bilateral integration; operator independence; emotional cycling; synthetic affect; Human Operating System.

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## Neurobiological Architecture of the Tripartite Model

The foundational premise of the Core Emotion Framework rests on the biological reality of three distinct yet integrated neural networks within the human body: the cephalic (head), cardiac (heart), and enteric (gut) nervous systems.<sup>2</sup> While traditional psychology has often focused almost exclusively on the cephalic brain, recent advances in neuroscience have validated the existence of intrinsic nervous systems in the heart and gut that possess millions of neurons and are capable of sensing, learning, and remembering independently of the head brain.<sup>2</sup> This biological triad forms the anatomical substrate for the CEF's three functional centers of intelligence.<sup>5</sup>

The cephalic brain, containing approximately 86 to 100 billion neurons, serves as the Head hub, responsible for meta-cognition, data analysis, and semantic processing.<sup>2</sup> Its specialized areas, including the cortex for thinking and the basal ganglia for coordination, allow for complex cognitive perception and meaning-making.<sup>5</sup> In contrast, the cardiac nervous system, or "heart brain," contains approximately 40,000 neurons and a complex network of neurotransmitters identical to those found in the head.<sup>2</sup> Research by J. Andrew Armour and others has shown that the heart functions as a sophisticated neural network that can sense and feel independently, frequently sending signals to the cephalic brain that are "obeyed," thereby influencing perception and emotional state.<sup>2</sup> Finally, the enteric nervous system, often called the "gut brain," consists of over 100 million neurons monitoring the gastrointestinal tract and mediating immune responses.<sup>5</sup> This system handles the conative foundations of the human experience, such as self-preservation, mobilization, and core identity.<sup>2</sup>

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Center of Intelligence	Primary Neural Network	CEF Functional Hub	Prime Adaptive Competencies
Thinking Center	Cephalic Brain (CNS)	Head Hub	Cognition, Analysis, Meaning-making, Creativity
Feeling Center	Cardiac Brain (Intrinsic)	Heart Hub	Emoting, Values, Relational Affect, Compassion
Action/Instinct Center	Enteric Brain (ENS)	Gut Hub	Self-preservation, Mobilization, Core Identity, Courage

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The interaction between these three "brains" is bidirectional and complex. Rather than the head brain acting as a top-down commander, research suggests that the heart and gut brains provide critical information that shapes cognitive perception and decision-making.<sup>2</sup> For instance, the gut-brain axis provides a two-way route of homeostatic communication through hormonal, immunological, and neural routes, linking emotional and cognitive centers in the brain to peripheral intestinal functions.<sup>9</sup> This connection is not merely metaphorical; approximately 95% of the body's serotonin is found in the gut, and disturbances in gut-microbiota communication are associated with central nervous system disorders such as anxiety and depression.<sup>5</sup> The CEF operationalizes these biological realities by treating the Head, Heart, and Gut as distinct functional processors that must be aligned and integrated to achieve psychological flourishing.<sup>1</sup>

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## The Head Hub: Cognitive Mapping and Navigation

The Head hub acts as the system's processor, responsible for navigation and logic.<sup>1</sup> In the CEF model, the Head does not "feel" the environment in a conventional sense; instead, it "maps" the internal and external landscape through three cognitive operators: Sensing, Calculating, and Deciding.<sup>1</sup> These operators ensure that the individual can gather data, analyze patterns, and commit to a clear orientation.

### Sensing and the SEEKING System

The Sensing operator represents the functional process of searching for something not yet found, whether it be meaning, emotional texture, or objective data.<sup>1</sup> This operator is heavily supported by the work of Jaak Panksepp in affective neuroscience, specifically his identification of the SEEKING system.<sup>11</sup> The SEEKING system is a primary-process emotional circuit that energizes the organism to explore its environment and forage for resources.<sup>13</sup> Unlike the systems associated with sensory pleasure, the SEEKING system is driven by dopamine and mediates a state of "exuberance" or "psychomotor eagerness".<sup>11</sup>

Neurologically, the Sensing/SEEKING operator is anchored in the medial forebrain bundle, traversing the midbrain, lateral hypothalamus, and nucleus accumbens.<sup>13</sup> It is Mother Nature's way of allowing animals to engage enthusiastically with the world, generating expectancies and seeking rewards.<sup>15</sup> When the Sensing operator is active, the individual exhibits curiosity and investigation; conversely, the failure of this system is strongly linked to the shut-down state of depression.<sup>12</sup> In the CEF, Sensing functions as perceptual tracking — an active search for subtle internal or external cues that precedes analysis.<sup>1</sup>

### Calculating and Logical Analysis

Calculating is the operator responsible for evaluating information through logical sequencing and structured analysis.<sup>1</sup> It corresponds to the left hemisphere of the cerebral cortex, which provides a digital, linear perspective and lends itself to the "thinking" life.<sup>7</sup> While Sensing gathers raw data, Calculating organizes this data into a coherent map, using pattern recognition and conceptual clarity to

analyze the environment.<sup>1</sup> This operator is essential for the cognitive restructuring processes found in evidence-based therapies like CBT, where individuals must analyze the "cognitive blueprints" that shape their emotional experiences.<sup>1</sup>

## **Deciding: The Point of Clarity and Commitment**

Deciding serves as the balancing operator for the Head center, integrating Sensing (data intake) and Calculating (analysis) into a stable point of clarity.<sup>1</sup> Deciding is a universal human capacity for orientation and commitment that is neither emotional nor motivational.<sup>1</sup> It represents the "common sense" of the system, allowing the individual to resolve cognitive dissonance and commit to a specific course of action.<sup>1</sup>

The physiological basis for the Deciding operator is supported by the skills of "Inhibition" and "Direction" within the Alexander Technique.<sup>1</sup> Inhibition is a volitional pause—a "magical moment of awareness"—before reacting to a stimulus, which prevents the individual from falling into habitual, reflexive responses.<sup>1</sup> This pause is the necessary precursor to Deciding, as it creates the space for a reasoned choice.<sup>1</sup> Direction then follows as the quiet initiation of action from a poised state, projecting the brain's message to the physical mechanism.<sup>18</sup> This postural and cognitive clarity provides the "stability corridor" necessary for the Deciding operator to function without introducing compensatory tension.<sup>1</sup>

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## **The Heart Hub: Affective Drive and Relational Aperture**

The Heart center generates relational and egoic vectors — openness (Expanding), protection (Constricting), and upward self-elevation (Achieving). This hub regulates the individual's relational aperture—how much they open to or close off from their environment—and the energy required to execute intention.

### **Expanding and the Broaden-and-Build Theory**

The Expanding operator is the drive for openness, inclusivity, and relational warmth.<sup>1</sup> Its functional mechanism is deeply anchored in Barbara Fredrickson's Broaden-and-Build Theory of positive emotions.<sup>1</sup> Fredrickson argues that positive emotions like joy, interest, and love serve to broaden an individual's momentary thought-action repertoire, allowing them to draw on a wider array of cognitions and behaviors compared to the narrowed focus of survival-based negative emotions.<sup>1</sup>

This broadening process increases relational aperture, shifting the system from defensive narrowing toward openness. Furthermore, the theory's "Building" component suggests that these broadened mindsets lead to the creation of enduring personal resources—physical, intellectual, social, and psychological. The Expanding operator also implements the "Undoing Hypothesis," which demonstrates that positive emotions can reverse the cardiovascular aftereffects of negative emotions, acting as a biological regulator that neutralizes the metabolically costly defense reactions. In CEF cycling, Expanding expresses as an 'amplifying fan' — a widening outward arc of openness that increases amplitude as relational aperture broadens.<sup>1</sup>

## **Constricting: Focus, Protection, and Energy Consolidation**

The Constricting operator represents the state of focus, protection, and consolidation of energy.<sup>1</sup> Its neurobiological foundation is articulated by Stephen Porges' Polyvagal Theory, specifically the unmyelinated dorsal vagal complex.<sup>1</sup> This system mediates defensive immobilization and metabolic conservation when the organism detects an inescapable threat.<sup>1</sup> In the CEF, this is viewed as the "tonic grip" or "bracing" pattern that restricts expression and movement to ensure survival during overwhelm.<sup>1</sup>

While essential for boundary-setting and refinement, Constricting becomes pathological when it becomes "fused" with other functions, leading to emotional rigidity and a "needing to be right" that inhibits connection.<sup>1</sup> Jacksonian dissolution describes how the nervous system, under stress, reverts to these older, primitive circuits.<sup>1</sup> The CEF uses emotional cycling to re-engage the "vagal brake"—the ventral vagal system that regulates cardiac output—to allow the system to move out of the Constricting state and back into social engagement (Expanding) and masterly action (Achieving).<sup>1</sup>

## **Achieving: The Heart's Action Vector**

Achieving is the ego-centric upward drive — the internal push to excel, refine, and elevate one's standing.<sup>1</sup> It represents the Heart center's action vector, translating intention into coordinated movement.<sup>1</sup> This operator generates an ego-centric upward drive in the Heart that transfers into the Gut as mobilization through the Boosting operator (gut centric).<sup>5</sup> Neurologically, Achieving relies on the coordination between the limbic system (emotional drive) and the motor cortex (physical execution).<sup>5</sup> When Achieving is balanced, the individual experiences a focused upward drive — a felt sense of striving toward refinement, excellence, and self-enhancement.<sup>1</sup>

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## **The Gut Hub: Conative Foundation and Motoric Engine**

The Gut center serves as the foundation or motoric engine of the CEF, anchoring the system through Arranging, Appreciating, Boosting, and the universal baseline operator, Accepting.<sup>1</sup> This hub handles the visceral sense of self, safety, and the "willpower" to act in the world.<sup>2</sup>

### **Arranging and Environmental Organization**

Arranging is the operator responsible for ordering tasks, creating workable structure, and stabilizing the environment.<sup>1</sup> It is the practical structuring function that ensures resources are organized effectively for action. This conative function is supported by the enteric nervous system's capacity to monitor gut functions and link them with the brain's cognitive and emotional centers to maintain gastrointestinal homeostasis.<sup>9</sup> In the CEF, Arranging ensures that the system has the necessary infrastructure to support its more expansive or assertive functions.<sup>1</sup>

### **Appreciating and Aesthetic Resonance**

Appreciating is the operator of resonance, value-recognition, and perceptual satisfaction.<sup>1</sup> It involves

noticing what is supportive or enjoyable in the environment and feeling a positive emotional connection to it.<sup>1</sup> Neuro-aesthetics research suggests that many brain networks are involved in the act of appreciating beauty, with the medial orbital front cortex (mOFC) being consistently implicated.<sup>22</sup> Appreciation is both a state and a trait, often aligned with the virtue of transcendence and the capacity to feel awe or wonder.<sup>22</sup> In the CEF, Appreciating provides the sense of value and meaning that balances the "perceptual hunger" of Sensing.<sup>1</sup>

## **Boosting: Conative Force and Energetic Propulsion**

Boosting generates conative momentum — the physiological and motivational charge that supports forward action.<sup>1</sup> It corresponds to the conative force—the "will to act"—and is somatically anchored in the dynamic engagement of the pelvic core.<sup>1</sup> In somatic psychotherapy and bioenergetic analysis, this is described as "charge," the flow of excitation through the body that builds the energy necessary to tolerate strong emotions and assert one's needs.<sup>1</sup> Chronic stress can lead to the "pelvic stress reflex," a subconscious shortening of the pelvic floor muscles that results in "armouring" and emotional numbness.<sup>1</sup> Boosting exercises in the CEF, such as vigorous swinging motions, are designed to build this energetic reserve and reverse chronic shortening patterns.<sup>1</sup>

## **Accepting: The Universal Baseline and Allostatic Recovery**

Accepting is the universal baseline operator that releases tension and restores grounded presence.<sup>1</sup> It is the capacity for settling, softening, and returning to a baseline state of release.<sup>1</sup> This operator is critical for "allostatic recovery," the capacity to restore healthy functioning after encountering stressors.<sup>24</sup> Accepting involves surrendering to gravity and discharging excess energy into the earth, a process facilitated by the "inward spiraling" motion in CEF cycling.<sup>1</sup> This release of tension is a biological necessity for long-term resilience and the prevention of allostatic overload.<sup>25</sup>

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## **Somatic Grounding and Postural Alignment**

The Core Emotion Framework emphasizes that psychological health is inseparable from the physical organism.<sup>16</sup> Somatic grounding and postural alignment are the physical manifestations of the CEF's midline axis and tripartite hubs.<sup>1</sup>

### **Pelvic Floor Integration**

The conative (Gut) center grounding is achieved through the dual activation of Boosting and Accepting, with the pelvic floor serving as the anatomical anchor.<sup>1</sup> Alexander Lowen posited that a person's dignity and identity are tied to their "biological ground," the contact with the feet and the release of the pelvis.<sup>1</sup> Grounding involves both "Supporting" (the connection to gravity/Accepting) and "Holding" (maintaining physical structure/Boosting).<sup>1</sup>

- **Accepting (Discharge):** The practitioner is guided to "relax the pelvis" and "drop the pelvic floor," allowing energy to flow to the ground.<sup>1</sup>

- **Boosting (Charge):** Coordinated engagement of the pelvic core builds the "charge" necessary for assertion and momentum.<sup>1</sup>

## Postural Alignment and the Primary Control

Postural alignment acts as the physical manifestation of the CEF's midline axis—Deciding, Achieving, Boosting, and Accepting.<sup>1</sup> The Alexander Technique teaches that the relationship between the head, neck, and spine—the "Primary Control"—is crucial for overall coordination and function.<sup>18</sup> Habitual tension in the neck distorts proprioception, leading to "faulty sensory awareness" and an inability to accurately perceive one's state.<sup>1</sup> By using reasoned "Directions" (e.g., "neck free," "head forward and up"), the practitioner supports the Deciding operator's function of orientation and commitment without compensatory tension.<sup>1</sup> This postural poise creates the "stability corridor" required for the dynamic side-to-side movements of emotional cycling.<sup>1</sup>

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Somatic Stage	Definition	CEF Operator Analogy
<b>Supporting</b>	Connection to gravity/foundation	Boosting/Accepting
<b>Holding</b>	Maintaining physical/energetic structure	Boosting/Arranging
<b>Containing</b>	Managing internal pressure/charge	Boosting/Constricting
<b>Limiting</b>	Setting functional boundaries	Constricting
<b>Discharging</b>	Releasing energy into the earth	Boosting/Accepting

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## Emotional Cycling and Midline Crossing: Neurological Bilateral Integration

Central to the CEF is the protocol of Emotional Cycling, a structured method designed to activate, differentiate, and balance the operators to foster resilience.<sup>1</sup> Cycling involves directional movements—either physical or imagined—to stimulate specific functional modes: Clockwise (CW) for outgoing activation, Counter-Clockwise (CCW) for reflecting activation, and Swinging for balancing activation.<sup>1</sup>

## Hemispheric Communication and the Corpus Callosum

The CEF's emphasis on "midline crossing" during the Swinging activations is corroborated by developmental neuroscience.<sup>1</sup> The midline is the hypothetical line separating the left and right sides of the body.<sup>27</sup> Crossing this midline indicates that the two hemispheres of the brain are communicating efficiently via the corpus callosum.<sup>27</sup>

- **Left Hemisphere:** Traditionally associated with logic, language, and the Calculating/Constricting operators.<sup>1</sup>
- **Right Hemisphere:** Associated with emotions, creativity, and the Sensing/Expanding operators.<sup>1</sup>

Midline crossing requires trunk rotation and core stability, strengthening the neural connection between the hemispheres.<sup>1</sup> This "bilateral integration" enables the "whole brain" to function as a team, allowing for the verbal expression (left brain) of emotional feelings (right brain) and preventing emotions from becoming unregulated.<sup>27</sup> Difficulty crossing the midline is often linked to "retained primitive reflexes," such as the Asymmetrical Tonic Neck Reflex (ATNR), which can hinder cognitive focus and emotional regulation.<sup>1</sup> CEF cycling protocols are designed to rebuild this foundation from the brainstem level to the cortex, ensuring balanced modulation.<sup>1</sup>

## Operator Independence and the Prevention of Fusion

A key goal of the CEF is maintaining "operator independence," which prevents "emotional fusion"—a state where different functional modes become involuntarily co-activated and rigid.<sup>1</sup> For example, in the "GoodPerson Anxiety Pattern" (GPAP), the Expanding operator is inhibited by over-active Constricting functions, leading to a loss of relational aperture.<sup>1</sup> Emotional cycling restores agility by strengthening the midline operators—Deciding, Achieving, Boosting, and Accepting—which provide the structural stability required for clean sequencing across centers.<sup>1</sup> This enables the individual to move out of rigid defense mechanisms and into adaptive strategies.<sup>1</sup>

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## Cognitive Construction and Interoceptive Prediction

The CEF's structural-constructivist architecture aligns with the Theory of Constructed Emotion proposed by Lisa Feldman Barrett.<sup>1</sup> This theory posits that emotions are not innate modules but are constructed predictively by the brain in the moment.<sup>3</sup>

### Interoception and Allostasis

The brain's dynamic internal model is built upon "interoception"—the representation of the body's internal milieu, including signals from the heart, gut, and other organs.<sup>3</sup> This interoceptive process is linked to "allostasis," the predictive regulation of the internal environment.<sup>32</sup> The brain uses past experiences, organized as concepts, to categorize current interoceptive sensations and external sensory input, thereby constructing an instance of emotion.<sup>31</sup>

In the CEF, the operators function as these "predictive categories" or "internal transformations".<sup>1</sup> Emotions are seen as the result of the brain's effort to process experience predictively online, comparing incoming sensory data with prior knowledge.<sup>32</sup> The CEF uses the operator decalogue to provide a granular structure for this construction process, identifying ten irreducible functional components that make up the "Human OS".<sup>1</sup>

## **Degeneracy and High Complexity**

The brain achieves its astounding complexity through "degeneracy," the capacity for dissimilar representations (different sets of neurons) to give rise to the same functional state or category (e.g., anger).<sup>32</sup> This means that instances of a specific emotional operator can be created by multiple spatiotemporal patterns in varying populations of neurons.<sup>32</sup> The CEF recognizes this complexity by defining operators as functional processes rather than static anatomical locations.<sup>1</sup> This allows for individual variation in how emotions are constructed and regulated based on personal history and context.<sup>33</sup>

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## **Clinical Application: Reframing Psychotherapy through CEF**

The CEF serves as an integrative lens for evidence-based psychotherapy, reframing diverse modalities to enhance clinical insight and client engagement. Each modality is mapped to the core CEF operators it primarily engages, helping clinicians select interventions that target specific emotional processes.<sup>1</sup>

### **Cognitive-Behavioral and Third-Wave Therapies**

Cognitive Behavioral Therapy (CBT) acts as a mental architect, identifying and restructuring the cognitive blueprints (Calculating) and behavioral choices (Deciding) that shape experience. Its focus on present-moment problem-solving aligns with the CEF's emphasis on regulation and meaning-making.<sup>39</sup> Dialectical Behavior Therapy (DBT) integrates mindfulness and distress tolerance to balance acceptance (Accepting) and change (Achieving/Expanding). Its structured stages offer a roadmap through emotional chaos.<sup>39</sup> Acceptance and Commitment Therapy (ACT) utilizes psychological flexibility to help clients commit to meaningful action (Boosting) despite the presence of pain (Accepting).<sup>39</sup>

### **Trauma-Focused and Somatic Modalities**

Eye Movement Desensitization and Reprocessing (EMDR) harnesses the brain's innate healing capacity by reprocessing "stuck" traumatic memories (Sensing) through bilateral stimulation (Arranging) toward integration (Accepting).<sup>39</sup> Prolonged Exposure (PE) aims to modify pathological fear structures (Constricting) through repeated, safe exposure (Sensing) and habituation (Accepting).<sup>39</sup> Cognitive Processing Therapy (CPT) restructuring "stuck points"—maladaptive trauma beliefs (Calculating)—to move from fragmentation to wholeness (Accepting/Deciding).<sup>39</sup> Written Exposure Therapy (WET) transforms trauma narratives (Expanding/Accepting) into vessels for witnessing resilience (Boosting).<sup>39</sup>

### **Relational, Humanistic, and Depth Therapies**

Interpersonal Psychotherapy (IPT) addresses the bidirectional relationship between mood and social functioning (Expanding/Achieving).<sup>39</sup> Psychodynamic Therapy (PDT) explores unconscious patterns and early attachment defenses (Sensing/Calculating) to achieve integration.<sup>39</sup> Person-Centered Therapy (PCT) fosters self-actualization through empathy (Expanding) and unconditional positive regard (Appreciating).<sup>39</sup> Schema Therapy (ST) combines techniques to target early maladaptive patterns (Arranging/Expanding) and achieve mode integration (Achieving).<sup>39</sup> Family Systems Therapy (FST) views the family as an emotional ecosystem where connections and boundaries (Expanding/Constricting) shape well-being.<sup>39</sup> Finally, the Unified Protocol (UP) targets core psychological processes across disorders (Deciding/Boosting) to foster broad-based resilience.<sup>39</sup>

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<b>Psychotherapy Modality</b>	<b>Primary CEF Operators Engaged</b>
<b>CBT</b>	Calculating, Deciding, Constricting
<b>DBT</b>	Expanding, Constricting, Accepting
<b>ACT</b>	Accepting, Boosting, Deciding
<b>EMDR</b>	Accepting, Sensing, Arranging
<b>CPT</b>	Calculating, Accepting, Deciding
<b>PE</b>	Sensing, Accepting, Boosting
<b>WET</b>	Expanding, Accepting, Constricting
<b>IPT</b>	Expanding, Constricting, Achieving
<b>PDT</b>	Sensing, Calculating, Expanding
<b>PCT</b>	Expanding, Appreciating, Accepting
<b>Schema Therapy</b>	Arranging, Expanding, Achieving

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**Family Systems**    Arranging, Expanding, Constricting

**Unified Protocol**    Constricting, Deciding, Boosting

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## Enneagram Integration: Reorganizing Fixation into Function

The Core Emotion Framework offers a unique reorganization of the Enneagram, mapping each type to the operator that reflects its "healthy functional mode" rather than its defensive fixation.<sup>1</sup> This distinction is essential for maintaining operator independence and emotional agility.<sup>1</sup>

### The Functional Re-mapping of Types

The Enneagram's traditional centers—Head, Heart, and Gut—often describe fixation patterns (e.g., Anger, Shame, Fear triads).<sup>1</sup> The CEF re-maps these types based on the functional architecture of the ten operators. For instance, Type 4 is mapped to the Sensing operator in the Head hub, reflecting a healthy expression of meaning-search and perceptual sensitivity.<sup>1</sup> Type 5 corresponds to Calculating (Head hub), representing analytical depth and pattern recognition.<sup>1</sup>

Within the Heart hub, Type 1 is mapped to Constricting, reflecting principled boundary-setting and energy consolidation.<sup>1</sup> Type 2 aligns with Expanding (relational openness), and Type 3 with Achieving (ego-centric striving for excellence and self-elevation).<sup>1</sup> The Gut hub includes Type 6 (Arranging/practical structuring), Type 7 (Appreciating/value-recognition), Type 8 (Boosting/conative force), and Type 9 (Accepting/universal baseline).<sup>1</sup>

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Enneagram Type	CEF Center	Healthy CEF Operator	Fixation / Core Issue
<b>Type 1</b>	Heart	Constricting	Internalized Anger / Idealism
<b>Type 2</b>	Heart	Expanding	Externalized Shame
<b>Type 3</b>	Heart	Achieving	Conflicted Shame
<b>Type 4</b>	Head	Sensing	Internalized Shame

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<b>Type 5</b>	Head	Calculating	Internalized Fear
<b>Type 6</b>	Gut	Arranging	Conflicted Fear
<b>Type 7</b>	Gut	Appreciating	Externalized Fear
<b>Type 8</b>	Gut	Boosting	Externalized Anger
<b>Type 9</b>	Gut	Accepting	Repressed Anger

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## Engineering the Psyche: ECM, INAS, and Synthetic Affect

The theoretical architecture of the CEF is transformed into a reproducible engineering standard through the Emotional Cycling Machine (ECM) and the Integrated Neuro-Affective Synchronizer (INAS).<sup>1</sup> These tools allow for the physical activation and measurement of the psychological states defined by the decalogue of operators.

### ECM v3.1 and INAS v1.0 Specifications

The ECM is designed to physically activate the Head, Heart, and Gut centers using mechanical systems that match user height and provide dynamic resistance.<sup>1</sup> It samples micro-tremor frequency, grip pressure, and motion irregularities to infer an "emotional load index".<sup>1</sup> The INAS serves as the integration engine, synchronizing activation across multiple somatic and cognitive layers.<sup>1</sup> This includes rhythm-stability thresholds and SOUNDFIELD lighting coherence to prevent overload.<sup>1</sup>

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<b>INAS Subsystem</b>	<b>Core Function</b>	<b>Integration Input</b>
<b>NARE-1</b>	Rhythm Engine	ECM movement patterns
<b>SSL-1</b>	Somatic Layer	Posture mapping, breath rhythm

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<b>CEAM-1</b>	Cognitive Module	Attention-state mapping
<b>ECI-1</b>	Environmental Interface	Soundfield and lighting coherence

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## Mathematical Modeling of Operator Activation

For synthetic systems, the CEF provides a technical specification where an operator maps a center-process pair to a scalar activation value.<sup>1</sup> This enables "Synthetic Affect," where operators are implemented as computational transformations—intake, analysis, commitment, and momentum generation—preserving independence and agility.<sup>1</sup>

A unified computational framework for modeling emotional states defines them as a weighted and non-linear integration of heterogeneous cognitive functions.<sup>36</sup> Each subset of cognitive functions ( $J_i$ ) is associated with a total weight ( $\omega_i$ ) calculated by:

$$\omega_i(t) = b_i + \sum (\alpha_{i,j} * F_{i,j}(t))$$

Where  $b_i$  is a bias representing the psychological profile (e.g., "Extremely Sociable" or "Very Calm"),  $\alpha_{i,j}$  represents directional influence, and  $F_{i,j}(t)$  are normalized degrees of cognitive activation.<sup>36</sup> The architecture uses a Softmax-based competitive mechanism to interpret these weights as competitive energies, ensuring that the system-level affective state remains continuously changing and self-rebalancing.<sup>36</sup> To ensure trajectory uniqueness and avoid deterministic redundancy, the model incorporates endogenous stochastic modulation through  $1/f$  noise, represented as  $\zeta(t)$ , reflecting the intrinsic micro-variability of attention and arousal.<sup>36</sup>

This modeling allows for the definition of high-intensity affective functional states as states of high-intensity cognitive integration.<sup>36</sup> It also permits the simulation of "Artificial Emotion" (AE)—internal states that emerge from consequences that matter to the agent's own objectives, creating intrinsically grounded behavioral adaptations rather than superficial mimicry.<sup>38</sup>

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## Conclusion: Synthesis and Implications for Structural Mastery

The synthesis of neurobiological, somatic, and cognitive science evidence provides robust support for the Core Emotion Framework and its tripartite operator model. The presence of distinct neural networks in the head, heart, and gut validates the three centers of intelligence, while affective neuroscience and constructivist theories provide a functional basis for the decalogue of operators. Somatic research into pelvic grounding and postural alignment identifies the physical anchors for conative and cognitive

stability.

The Emotional Cycling protocols operationalize these multi-scale dynamics, using midline crossing and directional movements to promote bilateral integration and operator independence. By strengthening the midline axis, the CEF enables individuals to navigate complex environments with greater agility and resilience, moving beyond rigid defense mechanisms toward integrated psychological functioning. This structural-constructivist model bridges the gap between clinical practice and engineering, offering a unified blueprint for regulation in both human practice and synthetic affective systems. The ongoing validation of the CEF through scale development and multi-level factor structure confirmation promises to further refine our understanding of these fundamental emotional processes.

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