Core Emotion Framework (CEF): Technical Specification 2 (TS-2)

Validation & Empirical Architecture

Canonical Architecture-Level Document — Version 1.0

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Version: 1.0
Date: 2025-12-29

Abstract

The Core Emotion Framework (CEF) Technical Specification 2 (TS-2) defines the formal empirical validation architecture of the CEF. Whereas TS-1 establishes the operational mechanics of centers, processes, operators, and activation dynamics, TS-2 specifies the canonical measurement models, factor structures, validation pathways, and falsifiability conditions required for scientific evaluation of the framework. TS-2 is an architecture-level document: it defines general validation logic applicable across all research contexts and does not prescribe study-specific hypotheses, datasets, or protocols.

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1. Purpose and Scope

1.1 Purpose

TS-2 establishes the empirical validation architecture of the CEF. It defines:

- canonical measurement models for operators and centers
- latent variable structure and identification rules
- empirical tests for directionality, fusion, and overflow
- state-transition validation methods
- falsifiability conditions for the architecture

1.2 Scope

TS-2 is a general, architecture-level specification. It does not include:

- study-specific hypotheses
- sampling plans

- statistical power analyses
- item-level measurement instruments

TS-2 defines the principles and structures that govern empirical testing across all implementations.

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2. Validation Architecture Overview

2.1 Validation Domains

The CEF requires validation across the following domains:

- structural validation of operators and centers
- process-level validation of operator distinctiveness
- center-level validation of hierarchical structure
- directionality validation for intra- and inter-center flow
- fusion and overflow validation
- state-transition validation

2.2 Validation Principles

Validation must satisfy:

- **Non-circularity**: empirical tests must not rely on assumptions derived from the CEF itself.
- **Testability**: all constructs must be empirically measurable.
- **Replicability**: results must be reproducible across samples and methods.
- **Cross-method convergence**: multiple measurement modalities must converge.
- **Cross-cultural generalizability**: constructs must remain stable across populations.

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3. Measurement Model Specification

3.1 Observable Indicators

Each operator must be associated with observable indicators that reflect its activation. Indicators may be behavioral, physiological, or self-report based.

3.2 Latent Variables

Operators are latent constructs inferred from observable indicators. A latent variable is an unobservable process whose activation must be inferred from measurable data.

3.3 Center-Level Latent Constructs

Head, Heart, and Gut are second-order latent constructs defined by their constituent operators.

3.4 Measurement Invariance

Measurement models must demonstrate invariance across groups, cultures, and contexts.

3.5 Operator Distinctiveness

Operators must exhibit discriminant validity. No operator may empirically collapse into another.

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4. Factor Structure Specification

4.1 Operator-Level Factor Structure

The canonical operator-level structure is a 10-factor model with distinct latent variables for each operator.

4.2 Center-Level Factor Structure

The canonical center-level structure is a 3-factor model representing Head, Heart, and Gut.

4.3 Combined Hierarchical Model

A hierarchical model nests the 10 operators within the 3 centers. Identification rules must ensure model stability and interpretability.

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5. Directionality Validation

5.1 Intra-Center Directionality

Sequential activation within centers (e.g., Sensing → Calculating → Deciding) must be empirically testable.

5.2 Inter-Center Directionality

Bidirectional influence among centers must be validated through temporal, structural, or computational methods.

5.3 Directionality Graph Testing

The canonical directionality graph must be tested using longitudinal, experimental, or computational approaches.

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6. Fusion and Overflow Validation

6.1 Fusion Detection

Fusion is defined as temporary cross-center modulation. Empirical signatures must reflect modulation without operator migration.

6.2 Chronic Fusion Detection

Chronic fusion must be identifiable through persistent, involuntary co-activation patterns.

6.3 Overflow Detection

Overflow occurs when activation exceeds home-center capacity and drives cross-center activation. Overflow must be empirically distinguishable from fusion.

6.4 Identity Preservation Tests

Operators must retain identity under all fusion and overflow conditions.

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7. State-Transition Validation

7.1 State Vector Observables

The emotional state is represented by a 10-dimensional process vector and a 3-dimensional center vector.

7.2 Transition Function Testing

The state-transition function $S\_\{t + 1\}$ = $f(S\_t, O\_\{c, p\})$ must be empirically testable.

7.3 Stability Validation

Stable states must exhibit convergence, canonical transitions, and absence of chronic fusion.

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8. Validation Methods

8.1 Self-Report Methods

Self-report indicators may assess operator activation, center activation, and fusion states.

8.2 Behavioral Methods

Behavioral indicators may include task performance, reaction times, and decision patterns.

8.3 Physiological Methods

Physiological indicators may include HRV, EDA, respiratory patterns, and somatic activation.

8.4 Computational Modeling

Computational methods may simulate activation matrices, directionality graphs, and state transitions.

8.5 Multi-Method Integration

Validation requires convergence across multiple measurement modalities.

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9. Falsifiability Conditions

9.1 Operator-Level Falsifiability

An operator is falsified if it cannot be empirically distinguished from other operators.

9.2 Center-Level Falsifiability

A center is falsified if its operators do not form a coherent second-order factor.

9.3 Directionality Falsifiability

Directionality rules are falsified if empirical activation flows contradict canonical pathways.

9.4 Fusion and Overflow Falsifiability

Fusion or overflow definitions are falsified if empirical patterns contradict structural constraints.

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10. Validation Roadmap

10.1 Short-Term Goals

- operator distinctiveness
- center structure validation
- basic directionality testing

10.2 Mid-Term Goals

- fusion detection
- overflow modeling
- state-transition validation

10.3 Long-Term Goals

- cross-cultural invariance
- longitudinal validation
- computational implementation

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11. Canonical Status

TS-2 is the authoritative validation architecture of the CEF. It is subordinate to TS-1 and the Core Essence Document and defines the empirical framework for all validation studies.
