The ΔΓ-Metamnesis Framework: A Thermodynamic Theory of Consciousness Based on Memory Acceleration Dynamics

How Dual Binding Resolves the Hard Problem and Binding Problem

Henri-Pierre Mathieu[1]

Orcid # 0009-0005-2161-548X

[1] AjourSanté Inc, 90 du Bassin, Weedon, QC J0B 3J0, Canada

Abstract

Phenomenal consciousness is proposed to arise when the second-order dynamics of memory change ($\Delta\Gamma = d^2M/dt^2$) exceed system constraints. Building on recent evidence that consciousness functions as a delayed memory system (Budson et al., 2022), this framework demonstrates that ΔΓ dynamics provide the computational substrate for both temporal binding (via covariance: $\Phi(t) = \mathrm{Cov}(\Delta\Gamma_1, \Delta\Gamma_2, ...)$) and phenomenal emergence (via energetic threshold: $E(t) > \theta\_E$).

The framework addresses the Hard Problem by making phenomenology measurable rather than mysterious, and resolves the Binding Problem by showing that unified experience emerges when ΔΓ covariance exceeds a threshold and constrains system action. Computational validation via an inverse Turing test demonstrates that ΔΓ-based features detectably differentiate conscious-like (60.4%) from baseline (50.2%) conversational dynamics ($p = 0.0036$, Cohen's $d = 2.04$).

Dual binding is proposed: (1) forward binding through temporal covariance $\mathrm{Cov}(\Delta\Gamma_1, \Delta\Gamma_2, ...)$ that unifies discrete qualia candidates into coherent phenomenology, and (2) backward binding via system constraint $|\partial A/\partial \Phi|$ where the unified phenomenology Φ demonstrably affects behavioral response A. Valid qualia require both high covariance ($> \theta_1$) and strong system constraint ($> \theta_2$).

Testable predictions include: (1) Musical phenomenology emerges 200–500ms after peak $d/dt[\mathrm{Cov}(\Delta\Gamma\_instruments)]$ ($r > 0.7$); (2) Prosopagnosics show reduced Cov(V4, FFA) ≈ 0.3 vs controls ≈ 0.8; (3) Anesthetics reduce $||\Delta\Gamma||$ below threshold θ_E, explaining loss of consciousness. The ~500ms delay observed by Libet et al. (1979) corresponds to the integration window required to compute Cov(ΔΓ) and evaluate E(t) against θ_E, unifying decades of timing paradoxes under a single mathematical framework.