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## Resource-Depletion Pattern: Cognitive Operation Under Scarcity

by [Nick Clark](#) | Published March 27, 2026 | [PDF](#)

When computational resources become scarce, the cognitive architecture does not fail randomly. It degrades in a structured, predictable pattern. The resource-depletion pattern describes how cognitive primitives are progressively shed as resources decrease: forecasting is reduced first, then affective modulation, then integrity tracking, with confidence governance and basic execution persisting longest. Understanding this shedding order enables graceful degradation planning.

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### What It Is

The resource-depletion pattern describes the characteristic order in which cognitive functions degrade under resource scarcity. The architecture defines a priority ordering for cognitive primitives: functions essential for safe operation persist while functions that enhance quality degrade first. This is not a

failure mode but a designed degradation sequence.

## Why It Matters

Understanding the degradation order enables deployment planning that accounts for resource-constrained scenarios. It ensures that the most critical cognitive functions, those that prevent harmful actions, are the last to degrade. It also enables resource monitoring that can predict which cognitive functions will be affected next as resources decline.

## How It Works

The shedding order reflects cognitive function priority: speculative forecasting sheds first because its absence reduces quality but does not produce harmful actions. Affective modulation sheds next because its absence produces socially suboptimal but not dangerous behavior. Integrity tracking sheds third because its absence allows drift but the drift is slow. Confidence governance and basic execution persist last because they provide the minimal safety guarantee.

Each shedding threshold is defined by policy and can be adjusted for different deployment contexts.

## What It Enables

The resource-depletion pattern enables agents that degrade safely under resource pressure. Rather than failing unpredictably when resources are exhausted, the agent progressively simplifies its cognitive operation while maintaining safety-critical functions. This graceful degradation is essential for edge deployments, mobile agents, and any context where resource availability is not guaranteed.

[Disruption Modeling All 21 steps →](#)

Recognize cognitive disruption before it stabilizes.

Primary Technical Disclosure

[◦ AQ-DSM: Diagnosing Cognitive Disruption as Loss of Coherence](#)

Secondary Technical

[◦ Cognitive Disruption as Architectural Phase-Shift](#)[◦ The Promotion-Containment Continuum](#)[◦ Attention Fragmentation: Reward-Biased Over-Promotion of Speculative Branches](#)[◦ Containment Collapse: Loss of the Speculation-Verification Boundary](#)[◦ Channel-Locked Promotion With Tolerance Escalation](#)[◦ Five-Axis Disruption Diagnostic Framework](#)[◦ Computable Therapeutic Dosing for Cognitive Disruption](#)[◦ Intergenerational Coherence Burden in Agent Lineages](#)[◦ Agent Self-Diagnosis and Autonomous Coherence Monitoring](#)[◦ Phase-Shift Early Warning System for Cognitive Disruption](#)[◦ Coherence Restoration Protocol Library](#)[◦ Positive and Negative Symptom Analogs in Containment Failure](#)[◦ Coherence Authorization Failure: Self-Disabling Execution](#)[◦ Pathological Verification Loop: Recursive Containment Audit Failure](#)[◦ Dissociation as Simulation Bypass: Acting on Unverified Planning](#)[◦ Affective Gradient Collapse: Self-Esteem Floor Lock](#)[◦ Resilience as Structural Capacity for Coherence Restoration](#)[◦ Personality Configuration Analogs From Stabilized Coping Regimes](#)[◦ Structural Dependency Patterns Between Agents](#)[◦ Destabilizing Attachment: Mutual Disruption Amplification](#)[◦ Resource-Depletion Pattern: Cognitive Operation Under Scarcity](#)[◦ Therapeutic Agent Interaction Through Behavioral State Recognition](#)[◦ Companion AI Relational Safety Constraints](#)[◦ Multi-Agent Group Coherence Dynamics](#)

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Applications (Specific)

[◦ BetterHelp Cannot Detect When Therapy Is Making Things Worse](#)[◦ Talkspace Has No Model of Therapeutic Destabilization](#)[◦ Headspace Cannot Detect When Mindfulness Destabilizes](#)[◦ Noom Tracks Behavior Without Modeling Cognitive Disruption](#)[◦ Spring Health Matches Therapists, Not Disruption Patterns](#)[◦ Lyra Health Measures Outcomes, Not Coherence Trajectories](#)[◦ Ginger.io Detects Behavioral Signals Without a Disruption Model](#)[◦ Cerebral Prescribes Medication Without Modeling Disruption Dynamics](#)[◦ Modern Health Offers a Care Spectrum Without Disruption Diagnostics](#)[◦ Calm Business Offers Relaxation, Not Disruption Detection](#)

[Disruption Modeling overview →](#)

AQ

deterministic

autonomy

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