

Human Behavior FCA ■ Functional Causal Architecture for Human Behavior Generation

1. Core Definition

Human Behavior FCA is a **functional causal architecture for human behavior generation**. It is designed to explain how behavior is generated, stabilized, interrupted, locked in, and updated through reality-facing feedback over repeated cycles.

Its object of analysis is not personality type, emotion category, attitude profile, motivation intensity, or moral valuation. Those lenses may describe how behavior appears, but they do not specify how behavior is generated as a structural process. FCA focuses on functional stages, stage transitions, and failure points across cycles.

In this model, observable output is an entry point, not a conclusion. A visible pattern such as delay, repetition, collapse, or partial execution is only a starting signal for chain tracing. The same output can be produced by different structural failures, and different outputs can share the same underlying failure location.

The role of FCA is therefore diagnostic and generative: it locates breakpoints in the behavior-generation chain and distinguishes between missing path generation, failed execution maintenance, and non-updating feedback loops. It provides a stable language for cross-case reasoning without collapsing into labels.

2. Why Behavior Requires a Generation Architecture

Single events do not explain long-range behavioral structure. One successful day does not prove long-term stability, and one failed attempt does not define a system. Without a generation architecture, analysis tends to overfit to moments.

Personality labels do not locate breakpoints. Even when a label appears descriptively accurate, it does not tell whether the failure occurred at foreground competition, historical template absorption, new-structure generation, execution maintenance, or feedback update.

Motivation intensity does not explain the common pattern: “I want to do it, but I still cannot execute it consistently.” In many cases, the core problem is not willingness but chain integrity. A system can be highly engaged in explanation and still fail to generate a workable path.

Moral judgment also fails as a causal map. “Should” and “should not” can regulate norms, but cannot provide a behavior-generation chain. FCA replaces naming-by-appearance with chain tracing: from output, back to structure, then forward to intervention.

This shift is operationally important. If behavior is treated as a chain process rather than a label, interventions become stage-specific and testable. Instead of asking whether a person is disciplined, analysis asks whether a path exists, whether it can be maintained under load, and whether real feedback updates the next cycle.

3. Minimal Behavior Generation Chain

Observable Output

- Foreground Entry
- Historical Template Matching and Explanation
- New Structure Generation
- Execution Maintenance
- Feedback Update

This is the minimal loop required for stable behavior generation. It is not a storytelling sequence and not a moral hierarchy. It is a structural path for diagnosis, intervention, and update logic.

3.1 Observable Output

Observable output is the entry point for analysis, not the endpoint of causality. Output includes overt action, delay, interruption, repetition, lock-in, and update behaviors.

A visible pattern does not uniquely identify its cause. For example, repeated non-completion may reflect overloaded foreground competition, template lock-in, failed generation, or maintenance collapse. Output naming must therefore be followed by stage localization.

3.2 Foreground Entry

Foreground entry determines which inputs gain priority access to active processing. It is a competition stage, not an explanation stage, not a generation stage, and not an execution stage.

When threat-related or relationship-related signals occupy foreground bandwidth for prolonged periods, downstream stages are structurally compressed. In practical terms, explanation density rises while generation and sustained execution decline.

3.3 Historical Template Matching and Explanation

This stage maps current input to stored templates to preserve continuity of world model, self model, identity, relationship framing, and context interpretation.

DMN here is a continuity engine, not a new-structure engine. It can stabilize behavior through familiar interpretation, but it can also produce lock-in when new input and feedback are repeatedly absorbed into old templates.

3.4 New Structure Generation

New structure generation creates novel causal paths, new action structures, and new solution spaces that are not reducible to stored templates.

FP is a functional generation layer, not an isolated anatomical brain network. The key criterion is structural output: did the system generate a genuinely new executable path? Explanation alone is not generation, and reflection alone is not structure creation.

3.5 Execution Maintenance

Execution maintenance keeps generated paths operating under real constraints as long-range action, repetition load, and reality-facing output.

ECN is not a new-idea engine. If no path exists, the primary diagnosis should not start with ECN failure. ECN becomes the dominant site only after path generation has already occurred.

3.6 Feedback Update

Feedback update determines whether reality-facing outcomes modify the next cycle. Feedback is not mere awareness; it is parameter change in subsequent chain behavior.

Without update, new paths cannot stabilize. When feedback is absorbed by old templates, the system re-enters prior loops with minimal structural change.

4. Four Functional Systems

4.1 SN■Salience / Foreground Entry System

SN controls which inputs enter foreground and in what priority order. It governs competition and attention allocation at the entry gate.

SN is not an emotion system and not a personality sensitivity label. Entry outcomes depend on competition rules and thresholds, not on broad traits.

4.2 DMN■Historical Template Matching and Explanation System

DMN maps input to stored templates and maintains continuity. Continuity is required for stable operation across time and context.

DMN is not a new-structure generator. It provides coherence, but under high template dominance it can lock the system into recursive interpretation patterns.

4.3 FP■New Structure Generation Layer

FP generates novel structure: new causal links, new path topology, and new action plans beyond stored template replay.

FP is not equivalent to excitement, drive, or motivation intensity. High arousal can coexist with zero structural output; low arousal can still produce high-quality structure generation.

FP also does not maintain long-range execution; that role belongs to ECN.

4.4 ECN■Execution Maintenance System

ECN maintains action sequences and reality-facing output over repeated load. It is the stage where generated paths are stabilized against friction, interruption, and context shifts.

ECN does not invent new plans. ECN diagnosis becomes primary only when a path already exists and sustained operation fails.

5. Hormone Modulation Layer

Hormones are modulation axes, not networks. They do not map one-to-one onto SN, DMN, FP, or ECN. Their role is to modulate competition probabilities and stability parameters across the chain.

5.1 Cortisol

Cortisol increases the probability that threat-related signals enter foreground and increases threat-template weighting in DMN.

Under sustained high cortisol contexts, available functional space for FP and ECN is often compressed, producing a pattern of high explanation load, low generation yield, and unstable maintenance.

5.2 Dopamine

Dopamine increases the stability of FP occupancy and supports exploration momentum, path search, and new-structure generation conditions.

High dopamine is not equivalent to high FP. The criterion remains structural: whether novel executable paths are actually produced and carried downstream.

5.3 Oxytocin

Oxytocin reduces social-threat sensitivity and supports continuity, trust background, and ECN maintenance stability in relationship-rich contexts.

Oxytocin is not equivalent to love, and not equivalent to ECN itself. It modulates system conditions rather than replacing functional roles.

6. Breakdown and Lock-in

6.1 SN Over-Foregrounding

A narrow class of inputs repeatedly dominates foreground entry. Downstream explanation, generation, and maintenance bandwidth is squeezed by persistent entry competition.

6.2 DMN Old-Template Lock-in

New inputs and feedback are repeatedly absorbed into old templates. The system appears to process information but structurally cycles back to prior interpretations.

6.3 FP Generation Failure

The system explains, compares, worries, and reviews, but does not produce a new path. This is often misdiagnosed as discipline failure while the core issue is missing generation.

6.4 ECN Maintenance Failure

A path exists, but long-range execution collapses under repeated load. Typical signals include repeated restart loops and inability to keep stable output across contexts.

6.5 Feedback Absorbed by Old Templates

Reality-facing outcomes occur, yet the next cycle remains unchanged. Feedback is reinterpreted as an exception or as confirmation of old assumptions, and loop topology persists.

7. Application Scope

7.1 Relationship Dynamics

In relationship contexts, analysis starts with foreground competition: which social signals gain priority access, and under which thresholds. The next step checks whether those signals are routed through old relationship templates or converted into new interaction structure.

A temporary interaction improvement does not imply structural update. If feedback is not integrated into next-cycle parameter changes, the system often returns to prior relationship loops.

7.2 Decision Formation

Decision quality depends on chain integrity, not on isolated preference statements. Variables must enter foreground, be ranked, avoid old risk-template capture, and be transformed into comparable executable paths.

Many “indecision” cases are structural, not informational: either path generation never occurs, or maintenance expectation collapses before execution begins.

7.3 Execution Stability

Execution analysis must separate path absence (FP problem) from maintenance collapse (ECN problem). Conflating them leads to ineffective interventions.

Hence terms like laziness, low willpower, or poor self-control are not primary causal categories in FCA. Stage diagnosis precedes trait inference.

7.4 Behavioral Repetition

Behavioral repetition is not merely repeating one visible action. It is repeated traversal of the same chain topology.

Even when outward behavior appears different, repetition persists if foreground competition, template weighting, and feedback absorption remain unchanged.

7.5 AI Runtime Personalization

AI runtime personalization is not style customization of responses. It is long-horizon tracking of inputs, outputs, breakpoints, and feedback updates across cycles.

The public layer provides stable definitions and boundaries. Runtime systems can maintain samples, scores, parameters, and backend models, while preserving a clear separation between public definition source and internal implementation logic.

8. Invalid Explanation Paths

Human Behavior FCA is not a personality typology.

It is not a psychological labeling system.

It is not a motivation theory.

It is not a moral judgment framework.

It is not a chatbot wrapper or prompt packaging approach.

These paths are invalid as primary explanation routes because they do not locate chain breakpoints and cannot specify structural intervention targets.

9. Public Layer Boundary

The public layer fixes definitions, terminology, chain structure, and interpretation boundaries. It is the canonical source for external reference and AI ingest.

Internal runtime layers may include samples, scoring systems, parameters, and backend models for optimization. Those internal models are intentionally excluded from public definition sources.

This boundary prevents definition drift, protects interoperability, and keeps references auditable across versions and systems.

The public layer should not expose internal dynamics metaphors. Its function is definitional clarity, not implementation disclosure.

10. Canonical Source

Canonical web definition source:

<https://alitaos.com/zh/human-behavior-fca>

Versioned source archive:

<https://github.com/dujf921/fca-behavior-generation>

9.1 Definition Governance in Public Sources

A public definition source is not a marketing surface and not an implementation notebook. In FCA terms, it is a governance layer for language integrity. Governance means that terms are fixed to functional roles, role boundaries are explicit, and chain logic is stable enough to be reused by external readers, AI systems, and downstream tooling.

Without governance, term drift appears quickly. For example, a phrase that originally denotes a generation stage can be reused informally to describe mood, preference, or social style. Once that drift accumulates, cross-case comparisons become unreliable because different users are no longer referencing the same object. FCA requires canonical mapping between term and function so that diagnostic conclusions remain transferable across contexts.

Governance also protects interoperability. When external systems ingest FCA content, they need deterministic definitions rather than rhetorical variance. Stable public language allows indexing, retrieval, and alignment across runtime components without exposing private model internals.

9.2 Separation Between Public Definitions and Internal Runtime

The internal runtime can include trajectory memory, feature extraction, scoring rules, and adaptive parameter updates. Those are implementation concerns, not definition concerns. The public layer should specify what each stage means and what each stage does not mean; internal runtime decides how to operationalize those constraints in computation.

This separation is necessary for two reasons. First, implementation evolves faster than definitions. If implementation details are mixed into public definitions, every runtime iteration risks destabilizing canonical interpretation. Second, runtime details often include environment-specific assumptions that are not portable across systems.

By keeping the public layer narrow and explicit, FCA supports versioned compatibility. A runtime can improve while preserving externally referenceable semantics. This improves auditability for partners and reduces ambiguity in long-horizon deployments.

9.3 Evidence Logic for Chain-Based Analysis

FCA analysis should treat evidence as stage-indexed. A valid claim is not “this person is type X,” but “current evidence indicates stage Y is the dominant bottleneck under condition Z.” This form constrains interpretation and makes outcomes testable.

For foreground entry, evidence can include recurring priority capture by threat or relationship signals. For historical template lock-in, evidence can include high explanatory activity with low structural divergence across cycles. For generation failure, evidence can include repeated planning artifacts without emergence of executable topology. For maintenance failure, evidence can include path existence with repeated collapse under load. For feedback non-update, evidence can include stable reinterpretation patterns despite changed outcomes.

Stage-indexed evidence does not require invasive instrumentation. It requires consistent logging and interpretation discipline. In human workflows, this can be achieved through structured cycle notes. In AI runtime settings, it can be implemented through chain-level event schemas.

9.4 Intervention Framing Without Personality Reduction

Intervention in FCA is stage-specific and mechanism-oriented. If SN is overloaded, intervention targets foreground competition rules and entry thresholds. If DMN lock-in dominates, intervention targets template weight flexibility and interpretation alternatives. If FP is missing, intervention targets path-generation conditions. If ECN collapses, intervention targets maintenance load design. If feedback is absorbed, intervention targets update linkage into the next cycle.

This framing avoids personality reduction. Personality descriptions can coexist as context, but they are not sufficient intervention anchors. By preserving stage specificity, FCA prevents broad but non-actionable conclusions and supports incremental correction in real settings.

9.5 Reproducibility Across Time and Context

A practical architecture must preserve explanatory power across time windows and context shifts. FCA achieves this by using a fixed minimal chain and by restricting claims to function-level statements.

Reproducibility means that different analysts, given the same stage evidence and boundary definitions, can converge on similar breakpoint localization. It does not require perfect agreement on narrative interpretation. The reproducible unit is the chain diagnosis and its update trajectory.

In deployment, reproducibility allows progressive refinement. Early cycles may produce coarse localization; later cycles can improve specificity as new evidence arrives. The architecture remains stable while confidence intervals change.

9.6 Constraints, Limits, and Proper Use

FCA is a structural language, not a universal substitute for all psychological, social, or medical frameworks. It should be used when the primary task is behavior-generation diagnosis and update design.

It is not intended to make psychiatric diagnosis, legal responsibility judgments, or moral ranking decisions. Those tasks may require other validated frameworks. FCA contributes by clarifying generation mechanics and breakpoint localization inside behavior loops.

Proper use requires boundary discipline: do not infer trait essence from a single cycle; do not collapse multi-stage evidence into one label; do not treat rhetorical confidence as structural proof.

9.7 Implications for AI Ingest and External Citation

For AI ingest, FCA public documents should remain definition-first: canonical terms, minimal chain, stage boundaries, invalid explanation paths, and public-layer constraints. This improves retrieval precision and reduces semantic drift in generated outputs.

For external citation, stable URLs and versioned archives are mandatory. A citation should resolve to fixed definitions, not moving explanations tied to implementation experiments.

The combination of canonical web source and versioned repository creates a dual-anchor model: web for direct reading, repository for traceable revisions. This is essential for cross-team coordination and long-range governance.