Axis II Freeze and Preregistration:
Generative Asymmetry and Worldline-Local Utility in UNNS

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Abstract

This document freezes the Axis II v1.0.1 pilot chamber as a validated experimental mechanism and preregisters the subsequent full-scale Axis II k-sweep. The pilot constitutes the first empirical breach of Axis I grammar-closure: compositional utility emerges under irreversible generative asymmetry, despite universal failure under symmetric grammar editing. We formalize the core discovery, record immutable implementation details, declare acceptance outcomes, and preregister the next experimental phase without parameter flexibility.

1 Axis I → Axis II Transition Theorem

1.1 Statement of the Transition

The completed Axis I program (Chambers XLI–XLIII) establishes the following structural result:

> **Axis I Closure Result.** Within symmetric, locally editable recursive grammars over the operator family $\{\tau, \sigma, \kappa, \rho\}$, compositional utility cannot be unlocked through any combination of:
>
> - admissibility tuning,
> - projection stabilization,
> - observer-like state collapse,
> - or parameter-level grammar mutation,
>
> even under persistent selection pressure.

This result is empirical, resolution-independent, and invariant across all tested grammar-editing mechanisms. It defines a *closure boundary*: utility is not negotiated at the level of grammar modification once generation has occurred.

1.2 Transition Theorem

We therefore formalize the following transition:

> **Axis Transition Theorem (Grammar → History).** If compositional utility does not emerge under any symmetric grammar-editing mechanism (Axis I), then any remaining permissive pathway must act at the level of *generation itself*, not post-generative editing. In particular, any successful mechanism must introduce irreversible generative asymmetry such that distinct histories are allowed to exist and persist independently.

This theorem does not assert that utility *will* emerge under generative asymmetry. It asserts only that *if* utility is permitted at all within the UNNS substrate, then it must be a property of histories rather than grammars.

1.3 Interpretive Consequences

The Axis I $\rightarrow$ Axis II transition implies:

- Grammar-level symmetry is insufficient for utility.
- Editing after generation (collapse, mutation, selection) is insufficient.
- Any remaining permissive structure must be:
  - irreversible,
  - non-recombinable,
  - and history-local.

Axis II is therefore not an extension of Axis I, but a categorical escalation: from *what grammars are allowed* to *what histories are allowed to exist*.

This transition is empirically justified and not a philosophical choice.

2 Purpose of This Document

This paper serves two strictly separated functions:

1. **Freeze**: Declare Axis II v1.0.1 pilot as a validated mechanism with a recorded discovery and immutable parameters.
2. **Preregister**: Define the full Axis II k-sweep experiment prior to execution, preventing post-hoc adjustment or interpretation drift.

No new hypotheses are introduced. No results beyond the pilot are anticipated.

3 Core Discovery Claim (Frozen)

Discovery Statement

> *Compositional utility is not a property of recursive grammars but can emerge as a property of specific irreversible generative histories.*

This constitutes the first empirical breach of Axis I closure. Chambers XLI–XLIII demonstrated that symmetric grammars, state collapse, and parameter mutation fail categorically to unlock utility. Axis II v1.0.1 demonstrates that when recursion branches irreversibly, utility can emerge in a subset of worldlines despite identical initial grammars.

Interpretive Boundary

The discovery does **not** claim:

- that utility is generic,
- that branching guarantees utility,
- or that optimization has occurred.

It establishes only that utility permission is *history-dependent* rather than *grammar-dependent*.

4 Frozen Pilot Specification (Axis II v1.0.1)

4.1 Chamber Identity

- **Chamber**: XLIV (Axis II — Generative Asymmetry)
- **Version**: v1.0.1 (Pilot)
- **Phase**: Pilot (N = 10 seeds)
- **Status**: Validated Mechanism

4.2 Code Hash and Artifacts

- **HTML Implementation**: `chamber_xliv_axis_ii_v1_0_1.html`
- **Results JSON**: `chamber_xliv_v1_0_101_02_2026-preregistered_results.json`
- **Code Hash**: `<INSERT HASH HERE>`

The above artifacts are frozen and must not be modified.

4.3 Frozen Parameters

- Seeds: 10
- Recursion depth: 400
- Motif: $M_2 \to M_1$
- Selection gate: S_3 (per-branch memory)
- Resonance: ρ OFF
- Branching operator: γ
- Branch multiplicity: $k = 2$
- Branch bias magnitude: $\varepsilon = 0.04$
- Bias application: multiplicative on motif parameters
- Bias set: $\{0.96, 1.00, 1.04\}$ (geometric mean ≈ 1.0)
- γ fire time: $t = 60$ (forced)

No parameters are adjustable post-freeze.

5 Pilot Results (Frozen)

5.1 Acceptance Criteria Outcome

Table 1: Axis II v1.0.1 Pilot Acceptance Criteria

Criterion	Required	Observed	Status
γ activation rate	$\geq 95\%$	100%	PASS
Mean BDI	≥ 0.1	> 40	PASS
Median contractions	$[50, 390]$	≈ 80	PASS
Zero-projection collapse	$= 0\%$	0%	PASS
Logging completeness	Yes	Yes	PASS

5.2 Key Observations

- Branch divergence is strong and irreversible (BDI $\gg 0.1$).
- One branch type consistently collapses; the other consistently stabilizes.
- Utility ($G^\circ = 1$) emerges in all stable branches.
- No aggregation across branches is required.

5.3 Pilot Verdict

Axis II v1.0.1 is declared a validated experimental mechanism.

The pilot phase has fulfilled its sole purpose: to verify that generative asymmetry can unlock utility without pathological dynamics.

6 Preregistration: Full Axis II k-Sweep

6.1 Objective

Measure how utility emergence depends on branch multiplicity k under fixed, validated generative asymmetry.

6.2 Frozen Design

- Seeds: 300 per variant
- Recursion depth: 400
- Motif: $M_2 \to M_1$
- Selection: S_3 (per-branch)
- Resonance: ρ OFF
- Branching operator: γ

- Bias magnitude: $\varepsilon = 0.04$
- Fire time: $t = 60$
- Bias application: motif parameters only

6.3 Variants

- $k = 1$ (control; no branching)
- $k = 2$ (minimal asymmetry)
- $k = 3$ (higher multiplicity)

6.4 Frozen Hypotheses

- **H_{11} (Generative Asymmetry):** Utility emerges for $k \geq 2$.
- **H_{12} (Minimal Multiplicity):** $k = 2$ is sufficient for utility.
- **H_{13} (Branch-Local Utility):** Utility is evaluated per branch, not via ensemble aggregation.

6.5 Metrics

- $G^{\circ}_{\text{branch}} \in \{0, 1\}$
- $\text{Projection}_{\text{branch}}$
- $\text{Contractions}_{\text{branch}}$
- Branch Differentiation Index (BDI)
- Surviving branch count

6.6 Falsification Conditions

- No branch achieves $G^{\circ} = 1$ for any k.
- Utility appears only at large k (violates H_{12}).
- Utility requires cross-branch aggregation (violates H_{13}).

6.7 Execution Lock

All parameters, hypotheses, metrics, and acceptance criteria are frozen. No changes are permitted once full runs commence.

7 Conclusion

Axis II marks a categorical shift in the UNNS program. Where Axis I established grammar closure, Axis II demonstrates that permission for utility is history-dependent.

This freeze secures the discovery. The preregistration defines the measurement phase. The next results will refine the boundary—not redefine it.