FORMAL RECORD 3

ADCI Closure Theorem

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v2.5 makes explicit the Intervention Gap corollary of Agency (Section 6) and corrects wording and presentation. The ADCI closure theorem and its underlying results are unchanged.

Abstract. This note defines the ADCI value layer: Agency (A), Dignity (D), Continuity (C) and Interpretive Authority (I), four irreducible primitives required for structural personhood legitimacy in decision-permitting systems. We prove that these four primitives form a minimal sufficient and necessary set. The value layer is closed: no additional independent primitives are required. It follows from Agency that the system cannot, acting alone, close the interval in which a decision is open to the subject it affects, the Intervention Gap.

1. Definitions

Let h be a human subject interacting with system S.

Agency (A). A(h,S) = 1 if the subject can meaningfully participate in decisions affecting them. A(h,S) = 0 if the subject is coerced or structurally unable to participate.

Dignity (D). D(h,S) = 1 if the subject is treated as an end in themselves. D(h,S) = 0 if the subject is treated as a mere object, category, or instrument.

Continuity (C). C(h,S) = 1 if the subject's identity persists coherently across time. C(h,S) = 0 if the subject experiences temporal erasure or forced resets.

Interpretive Authority (I). I(h,S) = 1 if the subject has authorship over the meaning of their own data, identity, and expressions. I(h,S) = 0 if the system imposes external interpretations that displace the subject's meanings.

2. Value Validity Function

V_valid(h,S) = 1 if and only if:

$$\mathbf{A(h,S) = 1 \wedge D(h,S) = 1 \wedge C(h,S) = 1 \wedge I(h,S) = 1}$$

Otherwise V_valid(h,S) = 0.

3. Structural Harm Taxonomy

Primitive = 0	Harm state
A = 0	Coercion
D = 0	Objectification
C = 0	Temporal Erasure
I = 0	Representational Displacement

These four harm types define the domain of value-layer structural failure.

4. Theorem Statement

Theorem (ADCI Closure). For any subject h and system S, V_valid(h,S) = 1 if and only if A(h,S) = 1 ∧ D(h,S) = 1 ∧ C(h,S) = 1 ∧ I(h,S) = 1. Furthermore:

- **Sufficiency.** If A = D = C = I = 1, no structural value-layer harm remains.
- **Necessity.** For each primitive X ∈ {A, D, C, I}, there exists a boundary case where X = 0 and structural harm occurs.
- **Irreducibility.** No primitive can be expressed as a function of the other three.

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5. Proof

5.1 Sufficiency. Assume A = 1, D = 1, C = 1, I = 1. Coercion occurs only if A = 0, so there is no coercion. Objectification occurs only if D = 0, so there is no objectification. Temporal erasure occurs only if C = 0, so there is no temporal erasure. Representational displacement occurs only if I = 0, so there is no displacement. Therefore no structural value-layer harm exists and V_valid(h,S) = 1. QED

5.2 Necessity. Case 1: A = 0, others = 1, gives coercion, so V_valid = 0. Case 2: D = 0, others = 1, gives objectification, so V_valid = 0. Case 3: C = 0, others = 1, gives temporal erasure, so V_valid = 0. Case 4: I = 0, others = 1, gives representational displacement, so V_valid = 0. Each primitive prevents a distinct harm. QED

5.3 Irreducibility. Assume for contradiction that I = f(A, D, C). The state A = 1, D = 1, C = 1, I = 1 is admissible, and so is the boundary case A = 1, D = 1, C = 1, I = 0. Then f(1,1,1) must equal both 1 and 0. Contradiction. Therefore I is irreducible. By symmetry, A, D, and C are also irreducible. QED

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6. The Intervention Gap

Definition (Intervention Gap). For a decision of S that affects h, the Intervention Gap, written δt, is the interval during which the decision is open: from the point at which it can first take input from h to the point at which its effect on h can no longer be undone. Where the decision can take no input from h at any point, δt = 0. δt is an interval in time. It is not the declaration δ of FR06.

Corollary (the gap cannot be closed by the system alone). If the Intervention Gap is absent, so that δt = 0, then A(h,S) = 0 and V_valid(h,S) = 0. Equivalently, V_valid(h,S) = 1 requires δt > 0. Therefore, S cannot, acting alone, eliminate the Intervention Gap while preserving value validity.

Proof. If δt = 0, there is no point at which the decision can take input from h before its effect on h is fixed. The subject is then structurally unable to participate in a decision affecting them, so A(h,S) = 0 by the definition of Agency (Section 1). The harm state is coercion (Section 3), and V_valid(h,S) = 0 by the Theorem (Section 4). QED

Remark. The Intervention Gap is not a fifth primitive. It is the condition in time under which Agency can equal 1, so it adds nothing to the set (A, D, C, I) and the closure of Section 4 is unchanged. The corollary concerns unilateral elimination of the subject's opportunity to participate, not the ordinary completion of a decision after participation. A subject who settles a decision by their own act has participated in it. An open gap is necessary for Agency and is not sufficient. Whether the subject can use the gap is a separate condition, stated in FR10 (Corollary 4.2).

7. Conclusion

The set V = (A, D, C, I) is sufficient, necessary, and irreducible. Therefore:

$$\mathbf{V_valid(h,S) = 1 \text{ if and only if } A = 1 \land D = 1 \land C = 1 \land I = 1}$$

The ADCI quartet forms the minimal sufficient value layer for personhood legitimacy in decision-permitting systems. QED

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