Actual Personhood

Agency, Identity and Recognition Across Time

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Abstract

What physical structure makes an acting, remembering system a person, and what makes its later experience belong to the same subject? Recognition Science connects this question to retained comparisons and the relationships an action changes. We derive exact constraints on that connection. A fixed reversible update stores and rereads a finite history; its main-state trajectory through one tape cycle determines the entire encoded initial state. Linearity excludes exact readout of every encoded pure state when the apparatus must also leave it unchanged and uncorrelated with the record. Exact universal duplication of a native signal is incompatible with linear evolution, while reversible transfer is possible. Participant consent survives grouping of subjects precisely when authorship is constant within each group. A unique fixed-total ledger extension retains native account updates and the external bond's participant effects. At a common native operand product, endpoint pulse-energy changes equal the corresponding scaled cost and signed-harm changes. These results constrain physical history, transfer and authority. Identifying that history with an experiencing subject still requires an occurrence-level experiential identification and a sound and complete law of subject composition. We state those obligations on the same physical objects.

Term	Mathematical object	Physical meaning used here
Occurrence	A particular comparison event	An event, including a later examination.
Boundary	A set of ledger accounts	The cut across which entries can post.
Record	A retained state or authored row	Information available to later activity.
Native signal	A vector in $\mathbb{C}^8$	The specified eight-coordinate carrier.
Tape	A fixed finite list of native ports	The same memory carrier at every tick.
Consent	Own-side authorship	Which participant wrote its side.
Subject	The bearer of an experience	The identity to be physically identified.

The central distinction is between retaining a physical history and identifying whose history it is. A complete personhood account must connect both. The results below make the first connection explicit and constrain what the second can preserve.

1 The same physical event has consequences for someone

A remembered comparison changes what can happen next. A claim entered on one participant's books changes a relationship with another. An interruption can preserve a description while preventing the activity that description concerns. Personhood requires an account of these physical events, their continuity and their bearer.

Recognition Science begins with distinguishable occurrences, the information required to compare them, and the further occurrence involved in examining a record. Its accepted forcing results have definite physical premises. Literal reporting of the specified comparison apparatus, together with continuity and reference calibration, selects the canonical comparison cost. The recognizing-join conditions select golden scaling; the retained linking conditions select three dimensions. These results supply the foundation used here. Each application still has to identify its apparatus, carrier and transformation. The relation between preserved consequences and adequate physical descriptions is developed in [1].

Ethics and economics concern those same physical relations. A moral state projects a bond ledger for an affected participant. Incident recognition cost and its change under an action are properties of that ledger transformation. Economic realization concerns the same transformation across production, exchange and shared constraints. The physical identification carries through the discussion of consent below: an author line belongs to an actual move on the books.

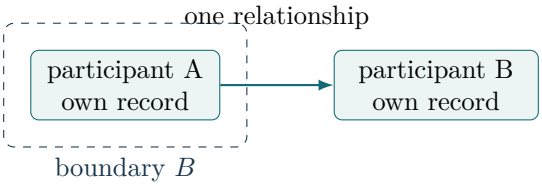

Figure 1: A shared physical relation does not collapse its two author lines. A boundary describes which accounts an entry crosses.

For a finite set of accounts, write an entry as $e = (e_d, e_c)$, with a debit endpoint and a credit endpoint. For a boundary B, its net posting is

$$\mathrm{net}_B(e) = \mathbf{1}_{e_d \in B} - \mathbf{1}_{e_c \in B}. \tag{1}$$

There are four membership cases. The net is nonzero exactly when one endpoint lies inside B and the other lies outside. Both endpoints inside give zero, as do both endpoints outside. Thus an aggregate cut can be silent about exchanges occurring among its members.

In the canonical crossing-chart construction, a boundary can be wronged exactly when its posting support is nonempty. This gives the entry threshold of one crossing, rather than a threshold of two or more. The construction reads wrongability from the relationship chart, independently of the present account balances. Applying it to a biological or artificial system requires the physical map from that system to the chart and its available crossings. That map also matters when a current window is quiet but the system retains a capacity to participate.

The argument now follows the history that such participation must preserve. We first show why record content can affect action. We construct a conserving account-ledger extension and a finite physical history, distinguish copying from transfer, and determine what grouping can preserve about consent. The final section states the experiential identification required for actual subject identity.

2 A retained record changes the next action

Consider a record of relations among three names. One record holds the path 0–1–2 and a second copy of its first edge. Another holds the same path and its closing edge 0–2. Each has three rows. The first leaves a supported conclusion unrecorded; the second has already recorded every supported pair.

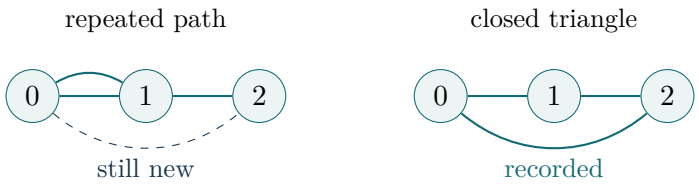

Figure 2: Equal row counts can leave different work for an attentive action law. The dashed edge is the missing conclusion.

A pair is supported when two held relations meet at a middle name. It is new when supported but not already joined in the record. Let $\mathrm{New}(R)$ denote these pairs. An attentive action law $D(R,p)$ is nonnegative, supported on $\mathrm{New}(R)$, has total mass one when a new pair exists, and is zero when none exists. These are the stipulated mathematical action conditions; the canonical greedy construction satisfies them.

Proposition 1 (Content cannot be replaced by count)**.** *Let R be the repeated path and T the closed triangle above. For every attentive law D, some pair p satisfies*

$$D(R,p) > 0, \qquad D(T,p) = 0,$$

although $|R| = |T| = 3$. Consequently, if a state encoding c and action reader a exactly realize this law, so that $a(c(U),p) = D(U,p)$ for every record U and pair p, then $c(R) \neq c(T)$.

Proof. The repeated path supports its missing closing pair, which has not been joined. Thus $\mathrm{New}(R)$ is nonempty, and the finite nonnegative sum of $D(R,p)$ is one. Some summand is positive. The triangle has no new pair, so its law vanishes at every pair. If $c(R) = c(T)$, the same reader gives equal values on both encoded states at the positive pair, contradicting the displayed inequalities. □

The record's content has a causal role in this exact action law. A counter holding only its length cannot realize the law. This is a concrete requirement on any physical or executable representation claimed to enact that action. Identifying a particular processor and its exchanges with this construction remains an implementation correspondence.

There is also a distinction between the successful-conclusion journal and the full occurrence history. A stalled examination can advance the examination clock without appending a conclusion. Trailing stalls can therefore leave the same conclusion journal with different clock values. Continuity cannot be inferred from that journal alone; the physical history used for continuity has to retain the relevant occurrences.

3 Retaining account history under conservation

A native debit or credit changes one of three account potentials by a signed unit. Taking these potentials as bond log multipliers preserves them, but a single post changes their sum. A conserving ledger must retain the compensating effect.

Let L have a finite active bond set B, positive multipliers m_b there, and directed endpoints defined for every bond ID. Write $T(L) = \sum_{b\in B} \log m_b$. Supply a conserved total C and an external bond ID $q \notin B$. Completion retains all endpoints and all multipliers outside q, activates $B \cup \{q\}$, and sets

$$\overline{m}_q = \exp(C - T(L)). \tag{2}$$

Call this enlarged state $\overline{L}$. Its endpoint data at q are supplied.

Theorem 2 (Unique conserved completion and exact action transport)**.** *The completed ledger has total log-flow C. Among ledgers on the same enlarged bond set that retain all multipliers outside q and have total C, its complete multiplier function is unique.*

Let an action a multiply m_b by $\exp(s_b)$, where s has finite support $S \subseteq B$, and let $A = \sum_{b\in S} s_b$. Retain the actor and every strain outside q, and assign strain $-A$ to q. The resulting action $\overline{a}$ has zero total log-strain and satisfies the whole-ledger identity

$$\overline{aL} = \overline{a}\,\overline{L}. \tag{3}$$

Proof. The enlarged total is $T(L) + \log\exp(C - T(L)) = C$. Any other permitted ledger must therefore have external log multiplier $C - T(L)$; positivity and exponential inversion determine that multiplier uniquely. All other multiplier values, including dormant ones, are retained by hypothesis.

The lifted total strain is $A - A = 0$. The original action changes the active total by A. Hence completion of its successor assigns $\exp(C - T(L) - A)$ to q, exactly its old external multiplier times $\exp(-A)$. Outside q both sides of (3) apply the original multiplier update. Their active sets and directed endpoints agree as well. □

3.1 The external participant effect remains in the ledger

Let J denote the canonical recognition cost. Completion adds exactly $J(\overline{m}_q)$ to the whole-ledger cost. A participant's incident cost includes that term precisely when the participant is at either endpoint of q; a self-loop is still counted once. Writing $h_i(L, a)$ for the change in participant i's incident cost, the same action identity gives

$$h_i(\overline{L}, \overline{a}) = h_i(L, a) + \mathbf{1}_{i \text{ incident to } q}\big[J(e^{C-T(aL)}) - J(e^{C-T(L)})\big]. \tag{4}$$

This is a signed change at an arbitrary baseline. Compensation does not imply that it vanishes or is positive.

For the native three-account representation, take $q = 3$. Four active bonds preserve all three original potential multipliers and transport every debit or credit post by (3). Full debit and credit records must still be retained; their difference alone does not recover them. This construction describes states and actions. Selecting and physically enacting the external bond, its endpoints and its energy source remain apparatus obligations. It supplies neither authority to intervene nor an experiencing subject.

3.2 The energy change of the same native ports

The ledger multiplier is a ratio reading. Its physical amplitude scale remains in the positive native operands u_b, v_b: assume $u_b/v_b = m_b$ and a common product $u_b v_b = \mu$ on the ports being counted. For a native pulse of dimension $N \geq 4$, define

$$E_S = \sum_{b \in S} (u_b^2 + v_b^2). \tag{5}$$

These are the existing native pulse input energies. Endpoint strain sends (u_b, v_b) to $(u_b e^{s_b/2}, v_b e^{-s_b/2})$, preserving the product and producing exactly the ledger successor ratio.

Proposition 3 (Native endpoint energy and participant harm)**.** *Under this ratio calibration and common-product condition, the endpoint energy changes on all active ports and on participant i's incident ports satisfy*

$$\begin{aligned} \Delta E_B &= 2\mu \, [\mathrm{Cost}(aL) - \mathrm{Cost}(L)], \\ \Delta E_{B_i} &= 2\mu \, h_i(L, a). \end{aligned} \tag{6}$$

For the completed ledger, impose the same calibration on its counted ports and apply the lifted action. The first identity then includes the external J-cost change, and the second includes exactly the incident external term in (4).

Proof. The existing native pulse identity gives $u_b^2 + v_b^2 = 2\mu[J(m_b) + 1]$. Product preservation keeps the same factor after strain. Sum over the fixed port set and subtract: the constant port-count terms cancel. Ratio calibration identifies the remaining sums with the ledger cost or participant incident cost. Apply (3) and (4) for the completed ledger. □

The identities retain signed changes at arbitrary initial ratios, and count a self-loop once. Conserving total log-flow does not assert conservation of these pulse energies. Physical preparation, coupling to an energy supplier and the full enacted motion remain to be constructed. The endpoint identity supplies no consent or subject identification.

4 A finite history on the original native carrier

The simplest memory question is constructive: can a fixed carrier retain a record, let it affect a later update, and remain reversible when a port is reused? The following construction does all three with finitely many ports. Its algebra is exact; the separate task of enacting its routing is stated below.

4.1 One main port and one record port

Let $\varphi = (1+\sqrt{5})/2$. For a source coordinate $x = (x_1, x_2) \in \mathbb{R}^2$, define its price and side coordinates by

$$p(x) = \varphi x_1 + x_2, \qquad s(x) = x_1 - \varphi x_2. \tag{7}$$

These coordinates are invertible. In the native eight-coordinate carrier, use the existing comparison encoding

$$\begin{aligned} N(a,b) &= \frac{1}{\sqrt{2}}(a,-a,0,0,-b,b,0,0), \\ \mathcal{E}(x) &= N\big(p(x)+s(x),\, p(x)-s(x)\big). \end{aligned} \tag{8}$$

The main port holds $\mathcal{E}(x)$; a scalar record r is held as $\mathcal{E}((r,0))$. The real coordinates here may have either sign. Positivity of physical comparator operands after port reuse is an additional apparatus question.

Write

$$\sigma = \sqrt{\varphi^2+1}, \qquad d = \varphi^{-2}, \qquad \gamma = \frac{\sigma}{\varphi\sqrt{\varphi}}. \tag{9}$$

The native dilation has $\gamma > 0$, $d > 0$ and $d^2 + \gamma^2 = 1$. Its unit update preserves p and rotates the pair $(s, \sigma r)$:

$$\begin{pmatrix} s' \\ \sigma r' \end{pmatrix} = \begin{pmatrix} -d & -\gamma \\ \gamma & -d \end{pmatrix} \begin{pmatrix} s \\ \sigma r \end{pmatrix}, \qquad p' = p. \tag{10}$$

This is the actual decoder-conjugated native rotation on the encodings in (8), including populated incoming record ports. Its inverse is the opposite-angle rotation. The two scalar outputs determine the whole input pair.

The incoming record also leaves an injective response in the main port when the old main state is known. Equation (10) gives

$$r = \frac{-d\, s - s'}{\gamma\sigma}. \tag{11}$$

The denominator is nonzero. Thus the old and new exact main coordinates recover the record that entered the update, in its original record units.

4.2 A fixed nonempty tape

Take $M \geq 1$ record ports, newest first, with scalar values $r_0, \ldots, r_{M-1}$. At every tick use the same operation: move the oldest port to the front, then apply (10) to it and the main port. If (x', r') is that gate's output on (x, r_{M-1}), the complete update is

$$F(x; r_0, \ldots, r_{M-1}) = (x'; r', r_0, \ldots, r_{M-2}). \tag{12}$$

When $M = 1$, the tail on the right is empty. The native carrier contains the corresponding encoded signals at every tick; its size does not grow with time.

4.3 One cycle reveals the whole encoded initial state

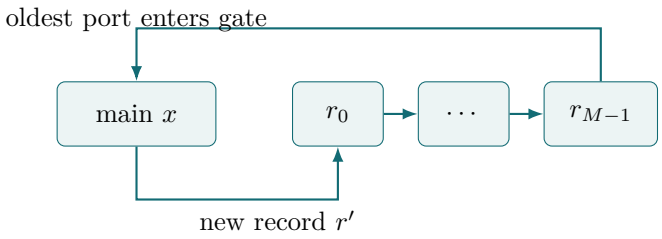

Figure 3: A fixed cyclic permutation and one fixed reversible gate update the same finite tape. The main trace includes the initial state and M successors.

For one port, (11) reconstructs the only incoming record directly. For several ports, each successive main transition reconstructs the record entering that transition. A complete cycle is enough because every tape position then holds a record written during that cycle.

Theorem 4 (Complete encoded finite-tape observability)**.** *On the encoded carrier in* (8)*, with* $M \geq 1$ *arbitrary real record coordinates and the fixed update* (12)*, the map*

$$(x; r_0, \ldots, r_{M-1}) \longmapsto (x^{(0)}, x^{(1)}, \ldots, x^{(M)})$$

is injective, where $x^{(k)}$ *is the main coordinate after* k *updates. Equivalently, equality of the exact native main-signal traces through the first full cycle forces equality of the entire encoded initial states.*

Proof. The scalar encoding is injective: its two comparison operands recover p and s, which recover x. The record encoding is injective as a special case. The native update stays in this encoded carrier for arbitrary incoming record values, by (10).

Consider two initial states with equal main traces. At every step $k < M$, their old and new main coordinates agree. Equation (11) therefore gives equal incoming records. Applying the same gate to equal main coordinates and equal incoming records gives equal newly written front records.

After one update the two front ports agree. After two updates the two newest ports agree: each old front has shifted one place, and each new front is equal. Inductively, after $t \leq M$ updates their first t tape positions agree. After M updates the whole tapes agree; their main ports agree by the trace hypothesis. Thus their complete final states agree.

The cyclic permutation has an inverse, and the gate has the inverse rotation. Their composition F is bijective, as is F^M. Applying this inverse to the equal final states proves equality of the initial states. □

The history is present in later physical consequences of the same finite dynamics. No extra reconstruction assumption is needed for this encoded carrier. The statement concerns exact states; it supplies neither a nondisturbing measuring instrument nor a finite-precision error bound. The cyclic permutation is explicit, while its native actuation and spatial routing remain apparatus obligations.

Starting with blank ports, this fixed update agrees with fresh-record accumulation until its capacity is filled. Reuse then couples to populated ports and stays reversible. Finite capacity is part of the construction. A claim of unlimited memory would require a further resource construction.

5 Exact reconstruction requires a physical readout

The tape theorem assumes access to exact main states. A physical apparatus must produce records that carry the information used in that reconstruction. On the same encoding, linearity excludes an apparatus that both leaves every pure signal unchanged and writes a record identifying it exactly.

Consider three signals in the image of $\mathcal{E}$ from (8):

$$\begin{aligned} a &= (\tfrac{1}{2}, -\tfrac{1}{2}, 0, 0, \tfrac{1}{2}, -\tfrac{1}{2}, 0, 0), \\ b &= (\tfrac{1}{2}, -\tfrac{1}{2}, 0, 0, -\tfrac{1}{2}, \tfrac{1}{2}, 0, 0), \\ c &= \tfrac{3}{5}a + \tfrac{4}{5}b. \end{aligned}$$

Each has coordinate sum zero and norm one. The inverse price and side coordinates prepare a and b, and linearity of $\mathcal{E}$ prepares c from the same combination of their real source coordinates. These are states of the original encoded carrier.

Theorem 5 (Undisturbed pure outputs cannot reveal every encoded state)**.** *Let A be any environment index set and let*

$$L : \mathbb{C}^8 \longrightarrow \mathbb{C}^{8\times A}$$

be one fixed complex-linear map. If for each $\psi \in \{a, b, c\}$ its output has the exact product form

$$(L\psi)_{ik} = \psi_i (e_\psi)_k,$$

then $e_a = e_b = e_c$. Consequently no such apparatus can both preserve every encoded mean-free unit signal in this product form and recover the exact original signal from its environment record.

Proof. Apply linearity to $c = (3/5)a + (4/5)b$. At signal coordinates zero and four, respectively, the product equations give, for every $k \in A$,

$$\frac{7}{10}(e_c)_k = \frac{3}{10}(e_a)_k + \frac{2}{5}(e_b)_k, \qquad -\frac{1}{10}(e_c)_k = \frac{3}{10}(e_a)_k - \frac{2}{5}(e_b)_k.$$

Adding the equations gives $(e_a)_k = (e_c)_k$; subtracting them gives $(e_b)_k = (e_c)_k$. Thus the complete environment records agree. An exact decoder of these equal records would return both a and b, although they differ at coordinate four. This is impossible. □

Exact preservation as an uncorrelated pure product is a material condition. The environment may include the apparatus, a retained reference and branch history; its dimension and normalization are unrestricted in this theorem. The result permits records of distinguishable occupation sectors, measurements that change the signal, and repeated preparations. It does not construct the tape's actual readout instrument.

An occurrence anchor must identify what an enacted apparatus acquires from the particular event. Mathematical reconstruction from exact state coordinates does not discharge that acquisition step, or identify the bearer of an experience.

6 Transfer preserves a state without duplicating it

An exact state and a record describing that state are different physical objects. This distinction matters whenever continuity is discussed through copying or migration. The native carrier gives a direct result about exact state duplication.

Call a signal $\psi \in \mathbb{C}^8$ admissible when $\sum_i \psi_i = 0$ and $\sum_i |\psi_i|^2 = 1$. Consider the explicit admissible signals

$$\begin{aligned} u &= (\tfrac{1}{2}, -\tfrac{1}{2}, \tfrac{1}{2}, -\tfrac{1}{2}, 0, 0, 0, 0), \\ v &= (0, 0, 0, 0, \tfrac{1}{2}, -\tfrac{1}{2}, \tfrac{1}{2}, -\tfrac{1}{2}), \\ w &= \tfrac{3}{5}u + \tfrac{4}{5}v. \end{aligned}$$

The supports of u and v are disjoint. Their norms are one, their inner product is zero, and w has norm one since $9/25 + 16/25 = 1$.

Theorem 6 (Three states exclude universal exact copying)**.** *For any environment index set A, there is no single complex-linear map*

$$L : \mathbb{C}^8 \longrightarrow \mathbb{C}^{8\times 8\times A}$$

such that, for every $\psi \in \{u, v, w\}$, there is a nonzero environment vector $e_\psi \in \mathbb{C}^A$ with

$$(L\psi)_{ijk} = \psi_i \psi_j (e_\psi)_k.$$

Consequently no map of this class exactly copies every admissible native signal. The environment is allowed to depend on the input state.

Proof. At coordinates $(i, j) = (0, 4)$, both $u_i u_j$ and $v_i v_j$ vanish. Linearity and $w = (3/5)u + (4/5)v$ imply $(Lw)_{04k} = 0$ for every k. Exact copying of w would instead give

$$(Lw)_{04k} = \frac{3}{10}\frac{2}{5}(e_w)_k = \frac{3}{25}(e_w)_k.$$

Thus every coordinate of e_w is zero, contradicting its required nonzero value. The three admissible states already obstruct copying the full admissible family. □

A fixed blank input and fixed apparatus can be incorporated into the map L; the obstruction concerns one linear evolution and exact product copies. It does not prohibit copying a classical file or a selected distinguishable family.

The source receives the blank; the target receives the state.

Figure 4: Exact transfer by a reversible coordinate exchange. Transfer makes a different claim from retaining two exact copies.

On the full pair carrier define $(Sf)_{ij} = f_{ji}$. Then S^2 is the identity, and finite index exchange preserves its inner product. Direct substitution gives $S(\psi \otimes b) = b \otimes \psi$. This proves exact reversible transfer. It supplies a state transformation; experiential continuity across an enacted transfer still requires the subject-continuity law.

7 Consent retains the participant who authored the move

Suppose two participants are assigned one common subject label. A move written by the first participant still has one own-side author. The common label alone cannot answer both "did the first write?" and "did the second write?" with their different correct answers. This obstruction can be characterized exactly for every grouping.

Let the participants be $I = \{0, \dots, n-1\}$ on a native relationship chart. Each has its own row of accounts. An own-side move by i adds a real journal v with $\sum_a v_a = 0$ to row i. A joint move writes the two ends of one relationship. The canonical consent predicate $\mathrm{Con}(m, i)$ is own-side authorship of that move. In particular, for an own-side move by j,

$$\mathrm{Con}(m, i) \quad \Longleftrightarrow \quad i = j.$$

This specifies the physical record reading of consent. Authenticating a particular permission message against that author line is a further correspondence task.

Let $q : I \to Q$ be a proposed grouping of participants. The values of q may represent a hypothesis about subjects; the theorem does not select that hypothesis.

Theorem 7 (Exact condition for consent to descend)**.** *For a fixed move m, there exists a predicate a on Q such that*

$$a(q(i)) \iff \mathrm{Con}(m, i) \qquad (i \in I)$$

if and only if consent is constant on each grouping fiber:

$$q(i) = q(j) \implies (\mathrm{Con}(m, i) \Longleftrightarrow \mathrm{Con}(m, j)).$$

For all own-side moves, one for each author with the same zero-sum journal v, this exact recovery is possible if and only if q is injective. If $v \neq 0$, every move in this family changes the books.

Proof. An exact predicate a gives the same answer at equal labels, proving fiber constancy. Conversely, constancy makes the answer on each occupied label well-defined: use the consent value of any participant carrying that label. Set an arbitrary value at unused labels.

For the family of own-side moves, suppose $q(i) = q(j)$. Apply fiber constancy to the move authored by j. Since j consents, i must consent too, which for that move means $i = j$. Thus q is injective. Conversely an injective map has singleton occupied fibers, so every consent predicate descends. Finally, if adding v to the author's row left the books unchanged, coordinatewise cancellation would give $v_a = 0$ at every account, contrary to $v \neq 0$. □

The result holds for genuinely changing moves. A grouping cannot replace participant-specific authorship unless it preserves the distinctions that authorship requires. This constrains any description of distinct participants within a proposed single experiencing whole.

Retaining participant rows resolves the representational issue for every grouping. For a native move that changes the books, its authors are exactly the changed rows. The complete reading can therefore use $(q(i), i)$ and test whether row i changed. A whole description preserves the members' author lines; the members remain subject to the shared physical constraints. Neither change in descriptive scale grants one participant authority to write another's side.

8 What makes this history belong to an experiencing subject?

Experience is an occurrence within reality. The dual-aspect account identifies an observable outside and an experiential inside of recognition activity [2]. Its physical attraction is continuity: experience belongs intrinsically to the process making distinctions, retaining comparisons and supporting action. Local boundaries and histories organize a perspective in that same reality [3].

Experiential identity is the decisive physical connection. History, response and consent properties alone do not select an experiencer. The complete account must identify an actual occurrence, its felt aspect and its subject independently of the proposed physical predictor.

8.1 Anchor the same occurrence

The occurrence specification retains a physical state, felt content and a subject. For declared occurrence pairs, an independent anchor must answer whether their subjects agree. An absent report supplies no negative answer; a late report falls outside a prospective window. Faithful report recoding preserves its answer without establishing experiential identity.

Physical acquisition has its own obligation: the acquired state and native comparison event must be the same occurrence, with recorded coordinates calibrated to that event. Matching a fitted numerical summary does not establish this correspondence for a human or artificial implementation.

8.2 Prove both directions of subject composition

Let o_i denote independently anchored occurrences, with physical components x_i and subjects c_i. For a proposed physical successor relation P, the required identity connection on the declared domain is

$$P(x_i, x_j) \quad \Longleftrightarrow \quad c_i = c_j. \tag{13}$$

For a physical graph G, let its subject closure be the established equivalence closure of the proposed subject-preserving links. The corresponding composition target is

$$i \sim_G j \quad \Longleftrightarrow \quad c_i = c_j. \tag{14}$$

These equations state the open physical identifications. Their right sides concern the independently identified subjects of those same occurrences. A label fitted to the left side cannot by itself supply that identification.

Both directions matter. Soundness requires every proposed continuation or composition link to preserve the actual subject. Completeness requires the links to recover every actual sameness relation in the declared domain. Sharing a field, exchanging energy, retaining a record and preserving a mathematical invariant each supply physical structure; the subject-preservation premise is what connects that structure to an experiencer.

Native transport sharpens the constraint. Invariance under every generator gives constancy on transport components, and on the full carrier when connected. Reading that invariant as one subject needs an actual experiential transport law. Choosing a constant label leaves this physical identification open.

9 Agency, standing and responsibility across time

An agent changes the relations in which it participates. Its records constrain later action, its authorship identifies the moves it wrote, and its history carries consequences forward. Actual agency requires correspondence between the physical system and these action laws, including the occurrences retained when no successful conclusion is appended.

Moral standing concerns the participant affected within the physical relationship structure. Wrongability depends on available relations, independently of present balances. Capacity and current activity must therefore remain distinguishable in the physical chart. Actual personhood needs that substrate map together with the experiential and subject identifications in (13)–(14).

Responsibility must preserve the action's author and the participant who undergoes its consequences. The consent theorem determines which grouped descriptions retain authorship. Authenticating an actual permission record against that physical author line remains necessary; benefit or an affirmative bit cannot supply the correspondence.

Persistence concerns an actual continuation. The transfer construction preserves a complete mathematical state across designated ports. Determining that later activity belongs to the same experiencer requires (13) on the enacted transfer. Handover, restart and interruption must be assessed against their actual effects on continuation and obligations.

The positive case for a unified experiential account is that recognition provides the physical structures for distinction, interaction, memory and self-reference. The next derivation must identify experience with that structure on the actual occurrence domain and derive how local perspectives compose.

Provenance and scope

The principal constructions are proved here on their stated carriers: attentive action, a unique conserving ledger extension with exact action transport and participant harm, calibrated native endpoint-energy identities, encoded finite-tape reconstruction, the exact product-preserving readout obstruction, the three-state copying obstruction, reversible swap transfer and consent factorization. The foundation retains the native reporting, recognizing-join and retained-linking premises. The boundary discussion uses the double-entry crossing chart.

The experiential reading and equations (13)–(14) remain physical identifications to establish. No actual subject classification or enacted transfer is inferred. A physical account can preserve an entire history and still owe an explanation of whose experience continues through it.

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