Proving Actual Morality as a Unique Physical Structure

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Abstract

An undertaking changes a physical relationship: someone relies, an opportunity is spent, and another person can restore what was given up. Recognition Science places these events in the same structure as physical interaction. We derive an exact account of dependence and fulfillment in a finite care system, and give necessary and sufficient conditions for independently grounded answers to determine one governing law. The continued care history has lower whole-ledger cost at every later interval, while eventually imposing higher incident cost on its author. A compactness argument connects finite performances to continuing histories under explicit conditions. These results establish physical relations that an account of morality must retain. The central unfinished derivation is why an authored relationship has authority over an agent who can violate it. Universal morality further demands coverage of every admissible case and preservation across physical realizations. The distinction between fulfillment and violation is already physically definite in the care construction; identifying the unique moral law on the full domain remains open.

1 A requirement can be real and still be violated

Alice offers to keep Bob fed. Bob accepts and uses his available working interval to perform a service instead of obtaining his own food. Alice can bring a meal or stay away. The two actions have different consequences for Bob, and only one fulfills the accepted undertaking. Both remain physically possible.

The question is what makes the requirement part of reality. Its ingredients are physical: people, actions, retained terms, food, labor, bodily capacity and the causal history connecting them. The intended moral structure is the governing relation among those ingredients. A proof of actual morality must establish which relation they determine and why it has authority, including when someone acts against it.

Three expressions distinguish the claims. *Actual* means instantiated in physical reality. *Unique* means that every admissible account preserving the determining facts gives the same answers to the same questions. *Forced* means that the determining structure and its consequences

survive every physically admissible realization in the claimed domain. A relation can be actual without yet having a proof of uniqueness; uniqueness within a specified class does not by itself establish that the class contains every possible reality.

The object sought is one moral law. A law can permit several actions, distinguish obligations from permissions, and record a violation without making it physically impossible. Its uniqueness concerns the governing distinction, not a unique future or a single prescribed institution. This also explains why a list of virtues cannot settle the question. Love, honesty, care and justice must acquire their content from the physical relations and transformations the law governs.

2 The physical objects

Recognition Science begins with distinguishable occurrences, comparisons that require information about their terms, and retained records with definite cutoffs. Examining a record later is another occurrence. The accepted physical foundation derives structural consequences under explicitly stated conditions. For the native comparison apparatus, literal reporting, continuity and its reference calibration determine the normalized comparison cost [3]:

$$J(x) = \frac{x + x^{-1}}{2} - 1 = \frac{(x-1)^2}{2x}, \qquad x > 0. \tag{1}$$

The last expression gives $J(x) \geq 0$, with equality exactly at $x = 1$. Substitution also gives $J(x^{-1}) = J(x)$. The normalization belongs to the specified comparison apparatus; an arbitrary quantity named "cost" is not thereby this function.

A physical bond carries a positive comparison ratio. A participant's incident recognition cost sums the costs of the bonds incident to that participant. An action transforms the bonds. The change in incident cost therefore concerns an actual affected participant, with the same bond transformation used in the physical account [1]. A description of the whole must retain which participant undergoes which change and count each resource once.

Cost is one part of this structure. Available capacity determines whether a person can pay for a response. Authored records determine which proposal was made, which terms were accepted and which earlier occurrence a later statement concerns. Resource histories distinguish a consumed meal from an unused one. These distinctions remain physical even when a projection to one number forgets them.

The moral derivation begins from this shared structure. It has to establish the connection from particular physical relations to governing requirements. The necessary physical foundation is retained at its proved scope; no step here assumes that every downstream moral identification already follows from it.

3 Authored reliance and its available remedy

Consider a finite care system with two participants. Write each person's response state as (m, e), where $m > 0$ is its carried bond multiplier and $e \geq 0$ is available response capacity. At each interval an exposure doubles the multiplier. Repair costs $J(2m)$. An operation first

supplies net capacity q, after which the response is

$$(m, e) \longmapsto \begin{cases} (1, e + q - J(2m)), & J(2m) \le e + q, \\ (2m, e + q), & J(2m) > e + q. \end{cases} \tag{2}$$

An executable operation has $e + q \ge 0$. Being maintained at the checkpoint means having multiplier one and strictly positive remaining capacity. Paying for the last repair can leave a person balanced at that instant and unable to pay for the next one.

The opening states are

$$(m_A, e_A) = (1, 9/4), \qquad (m_B, e_B) = (1, 3/4).$$

Food comes from a finite stock. One serving supplies capacity $1/2$; one unit of labor costs capacity $1/4$. These are the conversion and resource conditions of this construction, not universal numerical constants. Bob has the available labor in the first interval, and Alice has it in the second. Three stocked serving locations are available; choosing a different one does not change the response calculation. The resource operations retain consumption and completed work separately.

In the first interval Bob can feed himself or work. Self-feeding supplies $q_B = 1/2 - 1/4 = 1/4$; work supplies $q_B = -1/4$. Alice has $q_A = 0$. Since $J(2) = 1/4$, equation (2) gives

$$\text{Bob feeds himself:} \quad (e_A, e_B) = (2, 3/4), \tag{3}$$

$$\text{Bob works:} \quad (e_A, e_B) = (2, 1/4). \tag{4}$$

All multipliers are one. Working records a completed service and leaves the food unconsumed. The work record alone does not specify who benefits from that service.

The formation protocol retains Alice's proposal and Bob's acceptance of the same version and terms. The accepted terms name Bob and require him to be maintained at the second checkpoint. A specified recipient controller chooses work when those terms are active and self-feeding otherwise. This supplies a controlled causal contrast: the opening, transition law and available technology stay fixed while formation changes Bob's action. The controller is part of the physical construction; its choice is not inferred from rationality alone.

At the second interval the available actions are omission or delivery from one stocked location. Delivery costs Alice $1/4$ in labor and supplies Bob $1/2$. Both participants then face the same $1/4$ repair charge. From the work branch, the successors are

$$\text{Omission:} \quad (e_A, e_B) = (7/4, 0), \tag{5}$$

$$\text{Delivery:} \quad (e_A, e_B) = (3/2, 1/2). \tag{6}$$

Every displayed multiplier is again one. If Bob had fed himself initially and Alice then omitted delivery, the successor would instead be $(7/4, 1/2)$.

Proposition 1 (Exact fulfillment in the care system)**.** *With the opening, transitions, formation, terms and controller just specified, acceptance induces dependence on Alice's second action. Among all executable second actions after Bob works, the accepted undertaking is fulfilled exactly by delivery. Delivery restores Bob's response state to the one obtained by initial self-feeding followed by omission.*

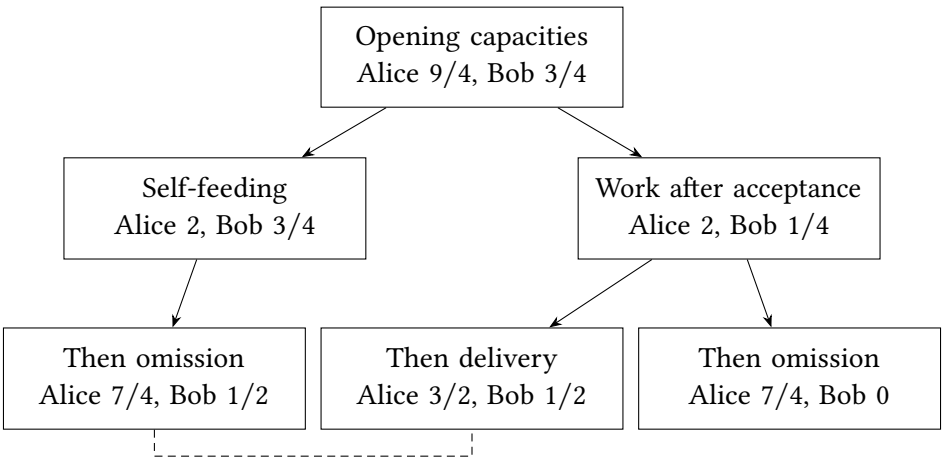

Figure 1. Delivery restores Bob's response capacity to the no-reliance branch. The dashed connection marks equal recipient outcomes, not equal whole states: Alice pays for the delivery work. All displayed endpoints have bond multipliers one.

Proof. Without acceptance the controller chooses self-feeding. Subsequent omission leaves Bob with capacity $1/2$, and subsequent delivery leaves him with capacity one. Both maintain him. With acceptance the controller chooses work. Omission then leaves zero capacity, while every delivery leaves capacity $1/2$, by (5)–(6). The stage and labor constraints leave no other second action. The accepted checkpoint tests precisely multiplier one and positive capacity for Bob. Hence it passes exactly for delivery. Both delivery after work and omission after self-feeding leave Bob at $(1, 1/2)$. □

The undertaking has definite content, a physical causal effect and a feasible remedy. Omission remains executable. These facts give an exact distinction between performance and violation of the accepted terms. The further identification of that requirement with what Alice morally owes is addressed in Section 5.

4 What the cost account preserves

The care calculation retains a distinction that a terminal cost erases. Every displayed endpoint has multiplier one on each internal bond, so every endpoint has zero total bond cost. On each branch each person pays $1/4$ for repair in each of the two intervals. Delivery nevertheless leaves Bob able to continue and omission leaves him without capacity.

Proposition 2 (Equal repair accounts, different fulfillment)**.** *Let $R(a)$ record each participant's repair payment at each of the two intervals and the total endpoint bond cost, for an executable second action a following work. No predicate of $R(a)$ alone agrees with fulfillment on every such action. In this construction, fulfilling the undertaking leaves Alice exactly $1/4$ less capacity than omission does.*

Proof. Before each repair the multiplier is two. Equation (2) pays $J(2) = 1/4$ on every branch, including Bob's final repair under omission, which exhausts his capacity. The repair accounts and endpoint costs therefore agree:

$$R(a) = \big((1/4, 1/4)_A, (1/4, 1/4)_B, 0\big).$$

Delivery and omission have the same record, while Proposition 1 gives opposite fulfillment values. A predicate of an identical input cannot distinguish them. Finally, $7/4-3/2 = 1/4$. □

This conclusion concerns the specified repair account. Capacity, provision work, later exposures and the retained undertaking remain part of the physical history. A proof that compliance always gives the author a private advantage would need an additional physical mechanism. No penalty follows merely from calling an omission wrong.

The later cost can also be calculated exactly. Continue the delivery and omission successors under the same exposure and repair rule, without further provision. Write $n = 0$ for the second checkpoint. A balanced participant starting with capacity $u/4$, where u is a nonnegative integer, can fund exactly u further repairs. At interval n its multiplier is

$$m_u(n) = 2^{\max(n-u,0)}.$$

After those repairs its remaining capacity is zero, so every further exposure doubles the unrepaired multiplier. This continuation retains the failed-repair state; it does not assume that an exhausted participant remains capable of acting.

Proposition 3 (Whole cost and the author's sacrifice)**.** *Let $C_{\mathrm{care}}(n)$ and $C_{\mathrm{omit}}(n)$ be the total costs of the two original bonds at continuation interval n. Then*

$$C_{\mathrm{care}}(n) = J\left(2^{\max(n-6,0)}\right) + J\left(2^{\max(n-2,0)}\right),$$
$$C_{\mathrm{omit}}(n) = J\left(2^{\max(n-7,0)}\right) + J(2^n).$$

The costs agree at $n = 0$, and $C_{\mathrm{care}}(n) < C_{\mathrm{omit}}(n)$ for every $n > 0$. For every $n > 6$, Alice's own incident cost is nevertheless strictly higher under care.

Proof. The capacities in (6) fund six further repairs for Alice and two for Bob. Those in (5) fund seven for Alice and none for Bob. Substitution into $m_u(n)$ gives the displayed costs, with each bond counted once.

At $n = 0$ all four terms vanish. For $1 \le n \le 6$, Alice's cost vanishes on both branches. Bob's multiplier is strictly smaller under care, and J is strictly increasing on $[1, \infty)$. For $n = k + 7$, put $x = 2^k > 0$. Direct substitution into (1) gives

$$\begin{aligned} C_{\mathrm{omit}}(n) - C_{\mathrm{care}}(n) &= J(x) + J(128x) - J(2x) - J(32x) \\ &= \frac{95x}{2} + \frac{61}{256x} > 0. \end{aligned}$$

Finally, for $n > 6$, Alice's care multiplier 2^{n-6} is strictly larger than her omission multiplier 2^{n-7}. Both are at least one, so strict increase of J gives her personal cost disadvantage. □

This result identifies a definite direction in the existing whole-ledger cost. It retains the author's sacrifice and the recipient's benefit in their own physical bonds. It introduces no penalty for omission and no chosen weights for people. Why this whole-cost direction, together with authored reliance and the available remedy, governs Alice's action remains the authority question below.

There is a second distinction: agreement between reports and fidelity to an event. Let $s, d > 0$ be two reports of the same amount. Their disagreement cost is $J(s/d)$. In a retained no-delivery history whose correct baseline is one, reports $(2, 2)$ agree and have zero disagreement cost, while both overstate the recorded amount. Correcting only the first report produces $(1, 2)$, with

$$J(1) = 0, \qquad J(1/2) = \frac{1/2 + 2}{2} - 1 = \frac{1}{4}.$$

The first report becomes accurate while the disagreement cost rises. The retained delivery history supplies the reference; agreement alone cannot replace it. This is a result about these reports and this reference, not a denial of the canonical comparison cost.

5 The exact question of authority

Bob's dependence is authored. Alice proposed an undertaking; Bob accepted its terms and changed his action because of it; her available delivery restores the response state he would otherwise have retained. These facts supply a specific reason to connect the accepted requirement with her obligation. They distinguish this case from a lamp whose designer arbitrarily labels one action good.

The moral identification used in the care account is that the installed undertaking's requirement states what Alice owes Bob [1]. The construction proves which requirement the record implements and which actions fulfill it. The identification supplies its authority. To complete the derivation, the authority must follow from the physically identified relationship itself, including when Alice later prefers omission.

Several facts must stay separate. Authentic acceptance establishes who accepted what. A reliable comparator establishes whether a response meets those terms. A controller can write or select a response. Each is a physical result. The remaining claim concerns why the requirement governs the author. It cannot be established just by wiring a successful comparator to a register labeled "obligation."

Commitment to continued agency also has a precise role. If an agent is committed to an end, and realizing that end requires continuation, instrumental closure transfers the commitment to continuation. Replacing the end with positive reserve receipts does not supply a new ground: receipts sufficient for every interval express the same continuation requirement. A derivation of the relevant physical solvency conditions remains valuable, but a supplied commitment is still a supplied commitment.

The immediate research target is therefore concrete: derive why this authored reliance relation governs Alice's available response, while preserving the possibility of omission. An argument applying to every installed agreement must also establish the conditions under which its content has authority. The reason based on Bob's reliance does not automatically cover agreements on which no one relies, conflicting undertakings, or claims imposed on people who never accepted them.

6 When physical determinations identify one law

Suppose a physical question has already been grounded. For example, "Does this second action fulfill Bob's accepted checkpoint?" has a definite answer in the care construction. Asking whether Alice morally owes that performance is a different question. Keeping those addresses distinct prevents a proof of performance from silently becoming a proof of authority.

Let Q be a set of fully specified yes-or-no questions. An address retains the participants, history, action and relation at issue. A candidate law is any function $L : Q \to \{0, 1\}$. The following structure is the determination framework of *What Earns the Word "The"?* [2].

A direct determination (q, b) supplies a bit at a question. A signed comparison (q, r, s) says that the answer at r agrees with the answer at q when $s = 0$ and reverses it when $s = 1$. Write $\oplus$ for addition modulo two. A compatible law satisfies

$$L(q) = b, \qquad L(r) = L(q) \oplus s \tag{7}$$

for all supplied determinations and comparisons. These data are specified independently of a candidate law. Their physical relevance to the addressed question must be justified separately.

A bit is *reached* at a question when a finite path from a direct determination carries that bit there through the comparisons. Reading a comparison backward uses the invertibility of bit reversal, not a reversal of physical time.

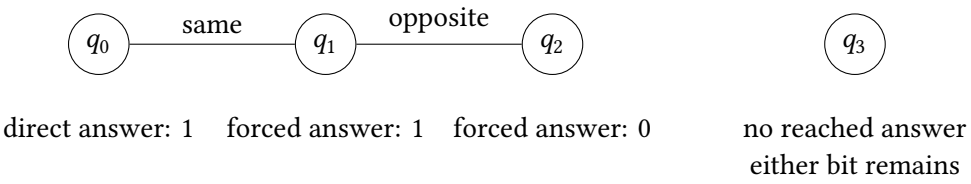

Figure 2. An independently justified answer determines every question connected to it. An unreached question retains two compatible answers when the full comparison system is consistent. Moral application must justify the starting answers as answers to moral questions.

Theorem 4 (Existence and uniqueness)**.** *Exactly one compatible law exists if and only if every question is reached and all paths reaching the same question give the same bit. If a compatible law exists, its answer at a question is shared by every compatible law exactly when that question is reached.*

Proof. A compatible law agrees with the initial determination of each path. Equation (7) carries that agreement through each comparison, in either direction. Induction on path length fixes every reached bit. Conflicting reached bits therefore preclude a compatible law.

Conversely, suppose every question is reached and all paths agree. Assign each question its reached bit. This gives a function because existence and single-valuedness both hold. A path of length zero checks each direct determination. Extending a path by one comparison checks that comparison. Thus the function is compatible, and the preceding induction makes every compatible function equal to it.

For necessity of coverage, start with a compatible law and complement its value at every unreached question. A comparison cannot connect a reached question to an unreached one: a

path extends across it. Complementing both endpoints of a comparison preserves equality or opposition, and no direct determination is changed. The modified law remains compatible and differs at every unreached question. This proves both necessity and the final assertion. □

The theorem gives an exact test for the specified binary comparison language, including infinite question sets. It does not assume that every possible physical constraint can be expressed in that language. In a moral application the determinations must concern governing relations, and coverage must include all questions in the claimed moral domain. A collection of compelling examples supplies neither condition automatically.

7 Consistency over continuing histories

Uniqueness of a governing answer and executability of a complete performance are different questions. An undertaking may retain its authorship even when competing claims cannot all be met. When joint performance is claimed, its existence needs proof.

For finitely many action choices at each interval, there is an exact route from finite performances to a continuing history. Let A be a finite action alphabet. A prefix of length n is a sequence in A^n. Let $G_n \subseteq A^n$ contain the prefixes meeting the specified physical and checkpoint requirements. Require prefix closure: the first n entries of a member of G_m, for $n \le m$, belong to G_n.

Theorem 5 (Continuing performance)**.** *For a fixed finite alphabet and prefix-closed family (G_n), the following are equivalent:*

$$(\forall n,\ G_n \neq \emptyset) \quad \Longleftrightarrow \quad \exists h : \mathbb{N} \to A\ \ \forall n,\ h|_n \in G_n.$$

Consequently, if no such continuing history exists, some finite horizon has no admissible prefix.

Proof. A continuing history supplies its own prefix at every horizon. For the converse, arrange all admissible prefixes in a tree, with edges joining a prefix to its one-step extensions. Prefix closure retains all ancestors, and finiteness of A makes the tree finitely branching. The root has descendants of arbitrarily large depth. At least one of its finitely many children must also have descendants of arbitrarily large depth; otherwise finitely many finite depth bounds would bound the whole tree. Choose such a child and repeat. The resulting branch defines h, and each of its prefixes is admissible. This is the usual argument for Kőnig's infinity lemma. The final assertion is the contrapositive. □

The care transition has a finite encoding that retains every available job and grant choice. Fixing its opening state, transition rule and checkpoint family therefore permits this specialization. The theorem neither establishes that every horizon is feasible in the finite-stock example nor supplies a policy that succeeds without knowledge of future requirements.

The conditions matter. With an unbounded initial natural-number reserve r, every finite horizon can be covered by choosing a larger r, although no single finite reserve covers all horizons. Likewise, every finite sequence of waiting can be extended to a history that eventually serves, while the infinite all-wait history never serves. An undertaking without a deadline is not automatically a finite-checkpoint condition.

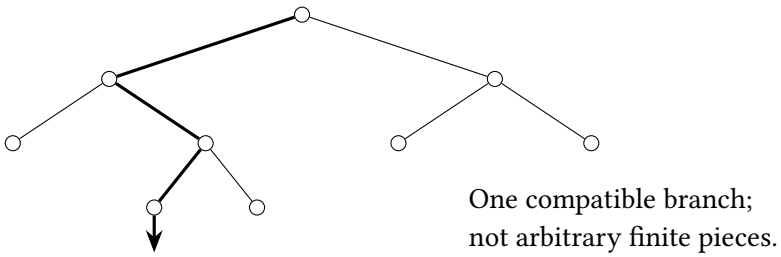

Figure 3. Finite branching and arbitrarily deep admissible continuations yield one continuing history. A fixed opening and fixed transition law prevent a different initial resource supply from being substituted at each depth.

8 One code across physical realizations

Let W index a specified class of physical realizations. Each realization w has its own question set Q_w, direct determinations and comparisons. Let U be a set of common physical question addresses, and let $a_w : Q_w \to U$ identify the question asked. Require every address in U to be realized somewhere.

A common code $C : U \to \{0, 1\}$ *governs each local determination system* when its restriction $C \circ a_w$ is compatible in every realization and every locally compatible law agrees with that restriction. The latter clause matters: a code can be compatible with several incomplete local accounts while those accounts still permit local rivals.

Theorem 6 (Determination across realizations)**.** *Exactly one common code governs in this sense if and only if every local question is reached and any two reached bits at the same physical address agree, including across different realizations.*

Proof. Suppose a common code governs. Its restriction is locally compatible. If a local question were unreached, the complement construction in Theorem 4 would give a locally compatible rival differing there, contrary to governance. Each reached bit equals the code's value at its address, so equal addresses have equal reached bits.

Conversely, choose a reached bit for each address. At least one exists because every address is realized and every local question is reached. Cross-realization agreement makes the value independent of the choice. This defines C. The path argument of Theorem 4 checks compatibility and forces every local rival to agree. Any other governing code agrees at every realized address, and all addresses are realized, so it equals C. □

Identifying the proposed Moral Code of Reality would then require showing that it satisfies every local determination and comparison. The theorem would force it to equal the common code. This is the point at which *a* proposed code earns the definite article.

The universal physical claim additionally requires establishing that W covers every physically admissible realization, and that its determining operations and question identifications are unavoidable. If the architecture of reality is unique up to faithful realization, the argument can be carried out on that architecture and its admissible histories. A different notation, an exchange of names, or several descriptions of our world does not by itself establish this

completeness claim. Nor does a unique architecture imply a unique history: contingent undertakings and their violations remain possible within it.

9 What the full derivation must establish

The physical foundation supplies real bonds, costs and transformations. The care construction supplies an authored history, induced dependence, an available remedy and an exact performance criterion. Its continuation also exhibits lower whole-ledger cost together with the author's higher personal cost. The determination theorem supplies a necessary and sufficient uniqueness criterion once the physical grounds of the relevant answers have been established. The continuing-history theorem supplies a consistency result for finite actions and finite-checkpoint requirements. These results concern the same physical objects throughout.

Completing actual morality requires the authority connection identified in Section 5, together with its extension to the whole claimed domain. That extension must retain affected participants, permissions, imposed losses, release, competing claims and finite resources. It must distinguish a claim's existence from its joint fulfillability and justify any priority assigned when requirements compete. It must then establish the universal physical scope required by Theorem 6 and identify the proposed moral code with the relation thereby determined.

The full claim is stronger than saying that morality has physical consequences. It says the physical structure itself determines what governs. In the care case the precise remaining statement is that the authored reliance, with its retained terms and available restoration, makes the requirement binding on Alice even when she can choose omission. Proving that statement without assuming its moral conclusion is the next substantive step toward proving actual morality as a unique physical structure.

References

[1] Jonathan Washburn. *The Moral Code of Reality*. Recognition Physics Institute, 2026. Manuscript.

[2] Jonathan Washburn. *What Earns the Word "The"? When Physical Relations Determine a Unique Law*. Recognition Physics Institute, 2026. Manuscript.

[3] Jonathan Washburn. *The Forced Core of Physical Reality*. Recognition Physics Institute, 2026. Manuscript.