

## # Paradox and Emergence

\*Working document, Virtualism Theory project. Second of the thread documents; depends on `foundations.md` for the apparatus of nodes, relationships, virtual wholes, facts, dimensions, and the categorial distinctions. This document develops the specific mechanism — paradox (and its dual, hypodox) — by which new dimensions and new arrangements are forced or admitted within that apparatus.\*

\*Revision history: a first draft led with paradox before establishing the relationship apparatus. That order put paradox in the position of explaining what relationships should be explaining first. A second revision moved the foundations into their own document and developed paradox-and-hypodox as the dual engine that runs on those foundations; the Eldridge-Smith hypodox apparatus, identified at that stage, gave the dual structure its name. A third round (May 2026) added the Mandala four-relationship-type stages as §6, the asymmetry of the dual engine as §7, the fourfold determination taxonomy in §3, and the constraint/opportunity vocabulary in §13, all in response to author annotations. The Eldridge-Smith citation was corrected to the 2025 Generic Definitions paper.\*

### ## 1. The question and the engine

Once the foundational apparatus is in place (see `foundations.md`) — nodes, relationships, virtual wholes, facts, dimensions, reducibility — the question that remains is: **why does anything ever change?** The substrate of virtual facts is, on its face, eternal. Facts do not demerge. What gets the universe out of mere static factuality and into

the dynamic regime of becoming?

Virtualism's answer is: **paradox**. More precisely, paradox and its dual, hypodox.

A **paradox**, in Virtualism's usage, is a discrepancy between the internal and external truth-values of a subject (Diary 064A, 28 April 2025). The internal facts and the external facts cannot both hold within the available dimensions, and the situation has no slack — no way of rearranging within what already exists to resolve the discrepancy. Something has to give. What gives, in the strong case, is that a new dimension emerges to absorb the discrepancy. This is **strong emergence**: the production of a new dimension.

A **hypodox**, by the dual structure, is an underdetermined situation: the internal and external facts are compatible, but neither is fully determined within the available dimensions. There is slack. Multiple resolutions are admissible, and which actualises is open. This is the substrate of **weak emergence** (production of new arrangements within existing dimensions) and of choice (the gap in which freedom lives).

The mature position is that the engine of becoming has two faces. Paradox forces strong emergence; hypodox permits weak emergence and choice. Together they are why anything changes, and why the universe is both lawful (paradox forces necessary outcomes) and probabilistic (hypodox admits multiple admissible outcomes).

The diaries arrived at the paradox-side of this engine first and worked it out most thoroughly. The hypodox-side is named here using Peter Eldridge-Smith's apparatus (2007–2025), which Virtualism did not have a name for but had been describing in other terms — the diary's

treatment of gaps as the seat of freedom (Diary 058), the anti-complementary entangled paradox (Diary 60B), the Liar paradox as self-referential gap rather than generative paradox (Diary 052, Diary 60B). Eldridge-Smith's duality is constructive for Virtualism in exactly the way the project instructions invite: an external contribution that sharpens what the diaries are already saying.

## ## 2. Paradox: the overdetermined case

### ### Definition

A paradox in Virtualism is a discrepancy between the internal and external truth-values of a subject, where the subject has determinate values on both sides and there is no available rearrangement that resolves the discrepancy within existing dimensions. (Diary 064A, 28 April 2025: *"A paradox may arise when there is a discrepancy between the truth values of the subject's internal relationships and the subject's external relationships."*)

This corresponds to what Eldridge-Smith calls *\*\*incompatible overdetermination\*\**: every relevant variable has a determinate value, but those values cannot all hold simultaneously. The classical paradoxes of philosophical logic — Russell's paradox, the Liar in its strongest formulations, the Sorites — are linguistic or set-theoretic instances of the same structural situation. The Virtualism interest, however, is in *\*actual\** paradoxes — paradoxes of fact, not of description — which is where the generative power lives.

### ### The worked example: rest mass

The diary's cleanest worked example is the rest-mass case (Diary 062B, 12 December 2024; Diary 064A, 28 April 2025). A real subject — say, any massive object — has *internal* values that, considered as a whole, amount to more than its *external* relationships can accommodate in three classical dimensions. The internal energy / mass-equivalence shortens the distances around the object; the external relationships with neighbours are arranged in flat three-space. Both cannot hold.

The Tardis figure compresses this into an image: rest mass as *"some internal values that paradoxically are more than the external values, something like a Tardis"* (Diary 062B). The resolution is the emergence of the boost dimension — the relativistic fourth axis. The internal and external truth-values become jointly satisfiable, but only because the subject now occupies more dimensions than before. The boost dimension is genuinely new; it is not predictable from, not reducible to, the prior three.

This is strong emergence in its physical case, and it is what General Relativity describes, but with the mechanism named: not mathematical formalism, but paradox-forced dimensional production.

### ### Three conditions for a paradox to be generative

Not every discrepancy generates. A discrepancy generates a new dimension when:

1. **It is actual.** The paradox must be a paradox of fact, not of description. Self-referential paradoxes (the Liar; "this sentence is false") are not generative because they refer only to themselves and have no external truth-values to be in discrepancy with. The diary is consistent on this: *"self-reference can never produce an*

answer, because it is a recursive call" (Diary 52); "gap values are gaps because they are only self-referential, and so are just stupid" (Diary 52). Self-reference is the absence of external relata, which is the absence of the very thing a paradox needs.

2. "It is unpreventable." "Only unpreventable paradox actually has creative power." (Diary 053B, 21 August 2023.) A discrepancy that the situation can resolve by rearrangement within existing dimensions does not force a new dimension. Generation requires that there is "nothing else" available. The paradox is generative precisely because it cannot be otherwise resolved.

3. "It is determinate on both sides." The internal and external values must be definite, not vague or open. This is the condition that distinguishes paradox from hypodox. A vague or underdetermined-looking discrepancy is — on Virtualism's reading — not a paradox at all but a hypodox, and its dynamics are different (§3).

When all three are present, paradox is generative; a new dimension must emerge.

### ### What a paradox produces

A generative paradox produces:

- "A new dimension", orthogonal to the existing ones, into which the discrepancy is absorbed. The subject now has more degrees of freedom along which to satisfy both internal and external constraints.
- "A demergence of incompatible prior facts." Simultaneously with the

emergence of the new dimension, some prior fact may cease to be \*real\* (though it remains \*true\* as a fact about the past). The wheel descending the slope cannot hold its old position and its new position simultaneously; the old position-fact demerges from reality while the new emerges into it. This bookkeeping is what conservation laws describe (Diary 059A, 4 February 2025).

- \*\*A new instance of Leibniz's Law.\*\* The new dimension, once produced, is one dimension. All instances of the kind of paradox-resolution that produces it produce the same dimension. "All electric charges are instances of the same electric charge" (Diary 062A, 7 November Addendum); all boosts share the boost dimension; all instances of two-ness share two-ness. The dimension is one whole, with many instantiations.

### ### Paradox versus contradiction

A paradox is not a contradiction in the standard logical sense. A contradiction is a sign that something is wrong — that a premise is false, a proof has miscarried, a description is incoherent. A paradox, in Virtualism's sense, is a sign that \*the world is doing something\*. The discrepancy between internal and external is real; both sides genuinely hold; the situation is — in the technical sense — both true and not true within the current frame.

This is also why dialetheism is misdiagnosed (Diary 052; develop in core\_ontology.md). Dialetheists take genuine paradoxes seriously but locate them at the level of propositions; Virtualism locates them at the level of facts. The proposition "this sentence is false" looks dialethic but is in fact a hypodox: there is no external referent that forces a determinate value. The proposition "Alice has both

classical position and definite energy" looks contradictory but is in fact paradoxical: both internal and external values are determinate, they conflict in three-dimensional terms, and the resolution is a new dimension. Dialetheism mistakes hypodoxes for paradoxes and so misses the generative case.

### ## 3. Hypodox: the underdetermined case

#### ### Definition

A hypodox is a situation in which the internal and external truth-values of a subject are compatible but not jointly determined within the available dimensions. There is slack. (The structural notion is Eldridge-Smith's; the term is his.)

Where a paradox is *\*incompatibly overdetermined\** (both sides fully determined but jointly impossible), a hypodox is *\*underdetermined\** (both sides admissible but neither fully fixed). Where a paradox forces something new, a hypodox *\*permits\** something.

The Liar paradox's dual, the Truth-teller ("this sentence is true"), is Eldridge-Smith's canonical example: every classical principle says it is true xor false, but no principle determines which. The Truth-teller is *\*consistent\** — there is no contradiction — but it is also *\*open\**. Many philosophical paradoxes have such duals (Russell's hypodox, the Heterological hypodox, time-travel hypodoxes, modal hypodoxes; Eldridge-Smith 2007, 2022, 2023).

#### ### Hypodoxes in the diaries, before the name

The diaries describe hypodox-shaped situations frequently without having Eldridge-Smith's term:

- **Self-reference and "word salad"** (Diary 52). "This sentence is false" cannot have a determinate value because it has no external referent. The diary correctly identifies this as a *gap*, not a paradox, and as therefore non-generative.
  
- **Gaps as the seat of freedom** (Diary 058, 5 November 2024). Where the subjective self has incomplete icons, the gaps "and their abstract shapes" confer freedom. Imagination operates in those gaps; from them "can potentially emerge any possibility that fits." This is hypodox structure exactly: an underdetermined situation admits multiple admissible resolutions, and choice operates on which one actualises.
  
- **Anti-complementary entangled paradox** (Diary 60B, 4 May 2025). When entangled facts have paradoxical truth-status, "the status you nail down is the one that then has to exist, and the other status ceases to be determined." Such states are "anti-complementary, like the undead, incomplete." This is hypodox dynamics: measurement resolves an underdetermined situation by fixing one admissible value.
  
- **Probability** (Diary 053B, 30 August 2023). The diary asks "why is the Universe probabilistic?" — and answers that emergent values at source and destination force the change to acquire direction and rotation. But what *is* probability, structurally, except a measure of admissible resolutions over a hypodox-shaped underdetermination? The diaries are reaching for this; the apparatus now lets us name it.

### ### What a hypodox produces

A hypodox, considered as a structural situation, supports:

1. **Weak emergence.** Where the existing dimensions admit several compatible arrangements, weak emergence selects one. Sperry's Wheel descending a slope, planetary orbits, crystal arrangements, chemical reactions running among admissible products — these are hypodox-shaped situations in which the available dimensions are sufficient to host the resolution, and what emerges is a new pattern rather than a new kind. (See §5 for the full strong/weak distinction.)
2. **Choice and freedom.** Where the underdetermination is in the substrate of consciousness (icon-gaps in Iconism's apparatus), the gap is where imagination and choice operate. The Tier 2 (Iconism) account of freedom is built on this; Sapolsky's biological determinism is the foil. The full development belongs to Iconism; for our purposes the structural point is that freedom is *hypodox space* — admissible underdetermination — not magical indeterminacy or random fluctuation.
3. **Probabilistic regularity.** Where the underdetermination admits several resolutions but with definite measures, what we observe is statistical regularity. The wave function in quantum mechanics is a compact description of a hypodox-shaped distribution; measurement is the operation that resolves it to one outcome.

### ### Eldridge-Smith's definitions

The cleanest available formulations are in Eldridge-Smith's 2025 paper *Generic Definitions of 'Paradox' and 'Hypodox'*:

> A **paradox** is "something that incompatibly overdetermines a sentence by granted principles, in some cases, given prima facie possible circumstances."

>

> A **hypodox** is "something underdetermined for lack of a granted principle that would determine the matter, in some cases, in given prima facie possible circumstances; and different principles could be consistently added to already granted principles that would determine the matter differently (i.e. in incompatible ways)."

Eldridge-Smith develops these definitions in the semantic and logical domains. The Virtualism move is to extend them to the ontological domain by an observation about relationships themselves. Since (per `foundations.md`) the fundamental ontology is virtual relationships and nothing else, and since every relationship admits one of a small number of determination-states, the paradox/hypodox duality is not an exotic edge-case of certain semantic constructions but a pervasive structural feature of the ontology. Paradox and hypodox apply to all relata between any kinds of objects, solely due to the nature of relationships.

### ### The fourfold taxonomy of determination cases

The full taxonomy of determination cases, for the ontological extension of Eldridge-Smith's apparatus, is fourfold:

1. **Non-determined.** No relationship between the existents beyond the bare fact of co-existence. No granted principles

apply; there is nothing to determine. This is the structural floor: the minimum non-zero condition for two existents to *be* co-existents at all.

2. **Underdetermined (hypodox).** Some granted principles apply, but they leave the matter open; different further principles, consistently added, would resolve it in incompatible ways. Intrinsic opportunity; permits rearrangement within existing structure.
3. **Fully determinate.** Granted principles apply and resolve the matter consistently and completely. The ordinary, non-generative case: a relationship has a definite character and can be read off. This is the steady-state condition; most of Reality, most of the time, sits here.
4. **Overdetermined (paradox).** Granted principles apply and resolve the matter incompatibly. Extrinsic constraint forces overflow into a new dimension.

Of these, two are the engine of becoming (paradox and hypodox), one is the steady state (fully determinate), and one is the floor (non-determined). Eldridge-Smith's semantic apparatus implicitly treats the floor and the steady state as background; the Virtualist extension makes them explicit, because at the ontological level the floor is where the architecture starts (the bare co-existence that ``nothingness_and_beginning.md`` has to earn) and the steady state is what most of Reality consists in at any given moment.

A possible alignment between the four determination cases and the

four relationship-type stages (§6) presents itself:

Determination case   Relationship stage
--- ---
Non-determined   Pre-stage: bare co-existence
Fully determinate   The steady-state condition within any stage
Underdetermined (hypodox)   Permits change within a stage
Overdetermined (paradox)   Forces transition between stages

This is tidy enough to be suggestive but tidy enough to be suspicious. It is registered here as a structural correspondence to investigate, not as a settled claim. If it holds, the four determination cases and the four relationship-type stages are not two parallel taxonomies but two views of one structure.

## ## 4. The dual engine

Putting paradox and hypodox together, Virtualism has a dual engine of becoming:

<b>Paradox</b>   <b>Hypodox</b>
--- --- ---
Eldridge-Smith   incompatibly overdetermined   underdetermined
Internal/external   both determinate but jointly impossible   both admissible, neither fixed
Slack?   none   yes
Engine for   strong emergence   weak emergence, choice
Resolution   new dimension (forced)   selection among admissible (permitted)
Diary register   "engine of strong emergence"   "gaps and their abstract shapes confer freedom"
Necessity   forces   admits
Example   rest mass, four-as-paradox-square   crystal lattice, Truth-teller, free choice

This is the structure that makes Virtualism cohere. Without paradox, the substrate of virtual facts is static. Without hypodox, every change would have to be forced — there would be no room for arrangement, probability, or choice. The dual engine accounts for both the lawful and the open dimensions of becoming, without invoking anything outside the ontology of virtual facts.

It also explains why Virtualism is *\*both\** deterministic (paradox forces the necessary) *\*and\** probabilistic (hypodox admits the multiple), without inconsistency. Determinism is the regime of paradox; probability is the regime of hypodox; both are present in the same universe at the same time, operating on different kinds of structural situation.

The diaries have been edging toward this position for years. Diary 060B (15 February 2025) asks: "Can we say that a paradox must: exist between two possibilities; that either the probability of both is 1 each; that either the probability of both is 0 each. Are there other paradoxical situations? That the probability sum of both is not 1." The question implicitly distinguishes paradox (probability sum exceeds 1 — overdetermination) from hypodox (probability sum less than 1 — underdetermination). The apparatus has been in formation; the name was missing.

## ## 5. Strong and weak emergence, properly grounded

With paradox and hypodox in place, the strong/weak emergence distinction (a recurring topic in the diaries) can be stated cleanly:

### ### Strong emergence

Strong emergence is the production of a new dimension by the resolution of an unpreventable paradox. The new dimension is genuinely novel — not predictable from, not reducible to, not of the same kind as, its parts.

(Diary 062A, 7 November 2025: *"Strong emergence is the creation of a new dimension, and only paradox has such godlike powers."*)

Examples (from Diary 062A, 9 November 2025): numbers, Euclidean objects, quarks and colour charge, space, electromagnetic charge, time, gravitational acceleration, kinetic energy, chemistry, biology, evolution, sensation, meaning, consciousness, society, culture, belief, money, knowledge, power, wisdom.

This is a wide list. The unifying feature is that each of these names a kind of fact that did not exist as a dimension before the relevant paradox forced it into being. Numbers were not always there; space is not a backdrop; consciousness is not weakly emergent from biology in the Sperry's Wheel sense. Each is a dimension that became available when an unpreventable paradox in the substrate of relationships forced it.

### ### Weak emergence

Weak emergence is the production of new arrangements within existing dimensions, by the resolution of hypodox situations. The emergent thing is novel as a pattern but not novel as a kind.

Examples (Diary 062A, 9 November 2025): light as change, gluons as change, entropy, rotation (Sperry's Wheel, planetary orbits), ferromagnetism, superconductivity, laws of behaviour like Ohm's Law.

### ### The Wilson dismissal, restated

Jessica Wilson's distinction between weak and strong metaphysical emergence (Wilson 2021, as engaged in Diary 062A, 7 November) reduces to: weak = same token powers, strong = some new token power. The diary's complaint stands: this is "emergence involves emergence" — it does not tell us *how* or *why*. Virtualism's distinction is operative because it specifies the mechanism: strong emergence happens because paradox forces a new dimension; weak emergence happens because hypodox admits new arrangements. There is structural content to each side, not just a restatement of the explanandum.

### ### Three sharpenings of the distinction in the diaries

The diaries refine the strong/weak distinction in three ways, each useful and each compatible with the paradox/hypodox grounding:

1. **By necessity vs possibility** (Diary 060A, 20 April 2025; Diary 062A, 7 November Addendum): strong is 100%, necessary; weak is possible. Maps to: paradox forces, hypodox permits.
2. **By relationship-type crossing** (Diary 059A, 4 February 2025): strong emergence crosses into a new relationship-type (a new sector of the Mandala); weak emergence stays within one. Maps to: a new dimension *is* a new relationship-type.
3. **By dimension-creation vs arrangement** (Diary 062A, 7 November): strong emergence is the creation of a new dimension orthogonal to what existed; weak emergence is an arrangement within existing dimensions. Maps to: paradox produces new dimensions, hypodox

selects within existing ones.

All three are saying the same thing. The cleanest single formulation, for the Acta paper or for command's `theory\_current\_state.md`, is:

- > \*Strong emergence is the production of a new dimension by the
- > resolution of an unpreventable paradox. Weak emergence is the
- > production of a new arrangement, within existing dimensions, by the
- > resolution of a hypodox.\*

## ## 6. The four relationship-types: where paradox and hypodox operate

The previous sections have characterised paradox (extrinsic overdetermination) and hypodox (intrinsic underdetermination) as the dual engine of becoming. The next question is: \*where, in the ontology, do these mechanisms operate?\* The answer is the Mandala apparatus — the four relationship-types in their emergent order. The full apparatus is the subject of its own working document (`mandala\_framework.md`, in prospect); the present section sets out only what is needed to locate paradox and emergence within it.

The four types describe four ways change can occur. One is type-preserving; three are type-changing, and the type-changing sequence is the order of emergence. Each stage is characterised by a particular relation between the inner and outer of the subject.

### ### Stage 1 — Sameness

Relation type is unchanged: change consists in more of the same. No constructive paradox arises, because nothing is added that contradicts

what is already there. The change is to an objective fact, and objective facts are properties of all things of the kind, so a change at this stage propagates universally: \*a new integer changes what it means to be an integer, so all numbers change, because all numbers behave as all integers.\* Stage 1 is where mathematics lives.

### ### Stage 2 — Difference

The relation type changes from sameness to other-than-sameness. This does not occur freely; it has to be forced upon Existence. \*Paradox is constructive of a new dimension along which differentiation can occur.\* Change at this stage is objectively external — it leaves inner parts unchanged, so all external relationships change at once. \*\*The paradox is that the outer changes but the inner does not. This is gravity.\*\*

Stage 2 is where the first strong emergence happens: the new dimension produced by paradox is what we call mass-and-space, and the relationship between objects in that dimension is what we call gravity. (The full mechanism is the subject of `gravity\_and\_space.md`; the point here is locational.)

### ### Stage 3 — Separation / internal change

Once difference has been forced, objects can be \*separate\* — they have outsides. Change can now be \*internal\* to a particular object, affecting just that object. For internal change to occur without violating conservation, paradox at this stage works by \*substituting\* a change in one place for a change elsewhere — \*it is less paradoxical to preserve the value than to cause it to disappear.\* Stage 3 is where transactional dynamics (a value subtracted at A is added at B)

become the basic operation. The photon transaction sits here.

Conservation, on this account, is a paradox-minimisation effect of the stage-3 structure rather than a separately stipulated principle. The diary makes the claim in the softer form (that preservation is \*less paradoxical\* than disappearance); the structural reading is the stronger one, that conservation \*follows from\* paradox-minimisation at this stage. The stronger reading is offered tentatively here; if it holds it does substantial work for the engagement with mainstream physics.

### ### Stage 4 — Whole / subjective sameness

The subjective sameness of the sum of the parts of an individual defines a \*whole\* that stands in virtual relationship to all other such wholes. Changing any of the parts changes the subjective whole, and that changes all external differences, and may even lead to a change of objective samenesses if there exists a match between separate wholes. \*\*This is acceleration.\*\*

Stage 4 is where the inner/outer relation comes full circle: internal change (stage 3) propagates outward through the whole (stage 4) and can produce changes in objective fact (looping back to stage 1). The cycle is what gives the Mandala its closed structure.

### ### Why this matters for paradox and emergence

The four stages are not four kinds of paradox. There is one kind of paradox — extrinsic overdetermination — operating in four structural contexts, producing four characteristically different emergent results: universal propagation of property (stage 1), new external

dimension (stage 2), conserved internal substitution (stage 3), and propagation through wholeness (stage 4).

The same is true on the hypodox side: one kind of hypodox — intrinsic underdetermination — operating in four structural contexts, with four characteristic species of opportunity.

This is what the project instructions refer to as "the four-condition definition." The four are not conditions on paradox itself but on its site of operation. The conditions on paradox itself remain three: actuality, unpreventability, and internal/external determinacy (§2).

### ### The derivability ambition

The four stages are presented above as a structural finding — here are the four ways change can occur, here is what happens at each. But the Virtualist commitment is stronger than that. If the fundamental nature of virtual relationships is what it is, then *\*what is possible\** for Existence is in principle derivable from that nature alone. We ought, if we were clever enough, to be able to work out a priori all the possibilities that govern how Existence is, even though our sensory and conceptual access to it is limited to a thin slice — the few dimensions that we call Reality.

This is not a claim that the derivation has been achieved. The current state of the four-stage account is that each stage is identifiable and its characteristic emergence is locatable, but the *\*transitions\** between stages — the precise structural mechanism by which stage 1 forces stage 2, by which stage 2 permits stage 3, and so on — remain partly schematic. Completing the derivation is one of the things this work is trying to do.

The commitment matters because it shapes what counts as success. A merely empirical taxonomy of emergent phenomena could in principle have any number of stages and any pattern of transitions; the four-stage account is offered as the *\*correct\** taxonomy because it follows from what virtual relationships structurally are. Where the account is presently schematic, the right response is to work it out, not to retreat to empirical humility. The argument is that the structure of Existence is derivable; the open work is doing the derivation.

This is also why mainstream consensus does not get to set the terms of the engagement. Mainstream physics, neuroscience, and philosophy of mind work from observed phenomena upward toward hypothesised structure; Virtualism works from structural necessity downward toward what must therefore be observable. Where the two meet, the meeting is on the merits, but the directionality of inquiry is opposite.

## ## 7. Asymmetry of the dual engine and the question of downward causation

A natural objection to the dual-engine framing is: if paradox produces a new dimension that then constrains its parts — the standard downward-causation mechanism — what is the corresponding hypodox-side effect? Does hypodox-resolution have any analogue of downward causation?

The answer is no, but the absence is principled rather than embarrassing.

**\*\*Hypodox cannot create a new dimension.\*\*** New dimensions arise from

extrinsic constraint — from the fact that there is *\*more\** determination than the existing dimensional structure can hold, forcing a new axis along which the surplus can be expressed. Hypodox is the structural opposite: there is *\*less\** determination than the existing structure could in principle accommodate. Where paradox has too much and must overflow, hypodox has slack.

**\*\*What hypodox does is permit rearrangement.\*\*** Where hypodox exists — Eldridge-Smith's island world, the leapyear birthday, any structural site where a granted principle is missing — constraint is necessarily relaxed, and that opens *\*opportunity\**. Nature, as it is said, abhors a vacuum; the opportunity is a reception area waiting for a gift. (Diary 062B and Diary 064A develop this in the language of quantum growth and gap-as-freedom.)

The mechanism is rearrangement of internal parts. Under relaxed constraint, intrinsic relationships can reconfigure — through sheer possibility, and through corresponding changes in extrinsic relationships that the rearrangement induces. Certain intrinsic arrangements correspond to *\*tension\** or *\*stress\** within the subject; an underdetermined arrangement, being more compact, corresponds to *\*relaxation\** and reduced stress. The maxim from Tai Chi — *\*relax\** — captures the mechanism at a level that is deceptively casual but exactly right.

This gives the dual engine a clean structural symmetry:

| Engine | Source | Mode of operation | Result |

|---|---|---|---|

| Paradox | Extrinsic constraint | Forces a new dimension | Strong emergence; downward causation by the new dimension on its parts |

| Hypodox | Intrinsic opportunity | Permits internal rearrangement toward less-stressed configurations | Weak emergence; configurational relaxation, no new dimension |

Downward causation, on this picture, is a \*paradox-side\* phenomenon. There is no hypodox-side analogue, because there is no new dimension on the hypodox side to do the constraining. What the hypodox side has instead is \*upward\* effect: changes in internal arrangement propagate outward through stage-4 whole-to-whole relationships, altering external relata without inventing any new dimension.

The asymmetry is the correct one. Paradox manufactures structure; hypodox redistributes within structure. If both did the same work, there would be no point in distinguishing them.

## ## 8. The unification with causation

A consequence of the dual engine — and the most ambitious claim in this thread — is that causation, change, and emergence are not three things but one. (Diary 062A, 21 November 2025: \*"causation and emergence are one engine. This is the engine of everything."\*)

The argument: any change in the world is the resolution of a paradox or hypodox. A change without such a resolution would be uncaused — an arbitrary movement that no internal/external situation forced or permitted — and no such change has ever been observed. Conversely, every internal/external situation that admits change does so because of a discrepancy or an underdetermination. So change = resolution of paradox/  
hypodox = emergence.

Causation is then the relational shape of this same process, considered

from before to after. The "cause" is the prior state (the internal/external configuration that has a paradox or hypodox in it); the "effect" is the resolution (the new dimension or new arrangement). The asymmetry from before to after is the direction of causation and the direction of time (see time.md for the time-side of this).

This unification dismisses the standard catalogue of theories of causation — Humean regularity, counterfactual, manipulation, probabilistic, process, dispositional/power — not as wrong but as \*partial\*. Each captures one aspect of the resolution process from one angle. The full picture is paradox/hypodox + resolution + before/after asymmetry, which is the structural account that all the partial theories are trying to approximate.

This is a large claim and it will likely want its own working document once the present one stabilises. It is registered here as a load-bearing consequence of the paradox/hypodox apparatus, not developed in detail.

## ## 9. The taxonomy

The Diary 062A list of strongly and weakly emergent phenomena (9 November 2025) gives a working taxonomy. With paradox/hypodox in place, it can be refined.

### ### Strongly emergent (paradox-driven)

Numbers, Euclidean objects, quarks / colour charge, space, electromagnetic charge, time, gravitational acceleration, kinetic energy (with the rotation distinction below), chemistry, biology,

evolution, sensation, meaning, consciousness, society, culture, belief, money, knowledge, power, wisdom.

Some of these (consciousness, sensation, meaning) belong primarily to Iconism for their full treatment; they are listed here as instances of the same mechanism running on different substrates. Society, culture, belief, money, etc. belong primarily to General Philosophy applications of the framework; the Virtualism position is that the \*same\* engine runs at every level — paradox forces a new dimension, whether the dimension is electric charge or social status.

### ### Weakly emergent (hypodox-driven)

Light as change, gluons as change, entropy, rotation-as-arrangement (Sperry's Wheel, planetary orbits), ferromagnetism, superconductivity, laws of behaviour like Ohm's Law.

### ### Demergent

The inverse — facts ceasing to be real as resolution proceeds. Position is the canonical example: movement requires the demergence of the old position-fact alongside the emergence of the new one (Diary 062A, 9 November; Diary 059A, 4 February). Demergence preserves the facts (the past is still true) while withdrawing the realities (the past is no longer real).

### ### Tensions in the taxonomy, addressed

The previous draft flagged two tensions in the taxonomy that the paradox/hypodox apparatus now resolves:

- **Rotation: weak or strong?** Listed as weak in Diary 062A but operative in the strong-emergent boost mechanism. Resolved by distinguishing **rotation-as-arrangement** (a hypodox-admissible movement within existing spatial dimensions — Sperry's Wheel, planetary orbits — weak) from **rotation-as-dimensional-shift** (the imaginary rotation that produces the boost dimension — strong, paradox-forced). The two are structurally different operations that happen to share the name "rotation."

- **Photons as weak or strong?** Listed as weak in Diary 062A. The paradox/hypodox distinction suggests the photon-as-event (a particular emission-absorption transaction) is weakly emergent — one admissible value-transfer within existing dimensions of charge and momentum. But the photon-as-kind (the kind of object that can transfer values like that) is strongly emergent, since the dimensions it operates in (electromagnetic charge, photon energy) are themselves strongly emergent. The taxonomy entry is correct for one reading and confusing for the other; worth making the distinction explicit.

### ### Open in the taxonomy

- **Trailing data points** (flagged in Diary 062B closing notes): quark emergence with  $rgb/+/-$ ; the role of primes as change-instigators; dark matter as undelivered photons; 137 (Diary 055A); gluons as calculatory device vs real. None affects the foundational mechanism but each is candidate working-out at the applications level.

- **"The movement of Atoms — Think about this"** (Diary 062A, 9 November, deliberately left as an open prompt). Worth coming back

to.

## ## 10. Worked cases

### ### The number cases (handed to numerogenesis.md)

The cleanest worked examples of the paradox-driven mechanism are the number cases — nothing-as-paradoxically-whole producing unity; unity as paradoxically-divisible producing two; the line from one to three; four as the first paradox-square (necessarily both  $1 \times 4$  and  $2 \times 2$ ); and the cascade of square, cube, and other emergent numerical dimensions that follow. These are taken up in numerogenesis.md, which becomes the cleanest demonstration tribunal for the paradox mechanism.

The Acta paper, in its strongest form, can lead with the four-as-paradox-square case (Diary 062A, 7 November 2025) precisely because it is a worked example of paradox-driven dimensional emergence with no physical assumptions at all. The case lives or dies on the foundational apparatus and the paradox mechanism alone.

### ### The physics cases (handed to gravity\_and\_space.md and time.md)

- **Rest mass and the boost.** Internal mass-energy values exceed what three external dimensions can accommodate; the boost dimension emerges. (Diary 062B, 12 December; Diary 064A, 28 April.)
- **Space curvature and gravity.** Once boost exists, it is shared by all massive objects (Leibniz's Law on indiscernible features — see foundations §5); gravity is the emergent differential of boost across a field of masses. (Diary 062A, 24 November Addendum.)
- **Time.** Emergent from change-in-space; the demergence/emergence

pairing that resolves the paradox of an object being both at its old position and its new position. (Diary 050; Diary 059A, 4 February.)

- **Position as emergent-and-demergent.** Position itself is a fact produced by numerical differences between objects, and is not pre-given. This is the apparatus that meets the measurement problem in QM: position does not pre-exist measurement because position is not a property of quantum objects in the substrate — it is what emerges when the right kind of difference-relationship is established. (Diary 064A, 28 April.)

Each of these is developed in its own thread document; here they are listed as instances of the same mechanism.

## ## 11. Commitments

The paradox/hypodox apparatus, taken together with the foundations, commits Virtualism to several positions worth flagging explicitly:

1. **Strong emergence is dimensional, not just behavioural.** The modern weak-emergentist view (Bedau, Wilson, organisational-complexity accounts) treats emergence as a matter of explanatory irreducibility within a fundamentally physical ontology.

Virtualism's claim is stronger: the emergent kind is a new *dimension*, a new ontological direction, not just a new pattern.

This is non-negotiable for the framework.

2. **Causation and emergence are one engine.** Argued in §8; committed to as a load-bearing consequence.

3. **\*\*Mainstream physics is partial, not wrong.\*\*** GR describes the downward-causation constraint imposed by emergent wholes (mass curving spacetime); QM describes the upward emergence (small constituents producing the large). They are two faces of the same process and the apparent conflict between them is an artifact of treating each as the whole story. (Diary 059A, 1 February: **\*\*QM = emergence; GR = downward causation.\*\***)
  
4. **\*\*The physical/metaphysical distinction is the wrong cleavage.\*\***  
The cleavage that does work is true/factual/real/ideal as set out in foundations §7. The physical is one kind of fact among several, not a special privileged base.
  
5. **\*\*Dialetheism mistakes hypodoxes for paradoxes.\*\*** Where Priest sees genuine contradictions tolerated by paraconsistent logic, Virtualism sees underdeterminations that classical bivalence has been applied to too aggressively. The Liar is hypodox, not paradox; treating it as a contradiction-tolerated-by-logic is a diagnosis of the symptom rather than the structure.
  
6. **\*\*The Hard Problem of consciousness becomes one instance of a general structure.\*\*** Consciousness is one in a series of strong emergences. The explanatory gap between brain and mind is the same kind of gap as between number and space, or matter and time. Tractable, not uniquely mysterious. (Develops in Iconism.)

## **## 12. Engagement with mainstream positions**

The foundations document (§7) listed the broad mainstream positions Virtualism partly overlaps. The paradox/hypodox apparatus permits

sharper engagements:

- **Wilson's two kinds of metaphysical emergence.** Dismissed for being structurally empty — "emergence involves emergence." The Virtualism reply is the mechanism: paradox/hypodox.
- **Kim's overdetermination objection** to weak emergence as incompatible with causal closure. The Virtualism reply: overdetermination is a feature in hypodox-driven cases, where multiple admissible resolutions can coexist (the wings-have-many-realizations example, Marie Kaiser, Diary 062A). Closure is preserved because each individual resolution is closed; the apparent overdetermination is the structural fact that more than one resolution is admissible.
- **McLaughlin's "not a scintilla of evidence" for ontological emergence.** The Virtualism reply: McLaughlin treats the physical as the ground of all things and emergence as metaphysical add-on, which the framework rejects. With foundations in place, the physical is itself emergent; there is no privileged base from which the rest must metaphysically derive.
- **Dialetheism (Priest).** The Virtualism reply: the paraconsistent-logic move tolerates apparent contradictions because it does not have the apparatus to distinguish overdetermined paradoxes from underdetermined hypodoxes. Once the distinction is drawn, classical bivalence does not need to be relaxed — the apparent contradictions resolve, structurally, into either genuine paradoxes (which produce dimensions, not tolerated contradictions) or hypodoxes (which are open, not contradictory).
- **Eldridge-Smith's hypodox apparatus.** Adopted constructively as

§3 sets out. Virtualism's contribution is to extend the paradox/hypodox duality from the semantic and logical domains (where Eldridge-Smith develops it) to the ontological domain (where it underwrites the dual engine of becoming).

- **Quine on what there is.** The Virtualism reply: the question "what is there?" is ill-formed if "there" presupposes a substantial ontology. The Virtualism answer is "virtual facts," with the categorial distinctions of foundations §7 distinguishing what *kind* of facts. The Acta paper's positioning is helpfully in this Quinean methodological tradition; the substantive answer differs.

These engagements are sketched. Each deserves its own working note in due course; the present document registers the structural positions.

## ## 13. Tensions and open questions

### ### Resolved by the revision

The previous draft flagged several tensions; the foundations + paradox/hypodox apparatus addresses them:

- *Hard/strong emergence as necessity vs as cross-type emergence.*  
Resolved: both characterisations are correct, with cross-type emergence being the deeper criterion (since the necessity follows from the impossibility of resolving the paradox within the existing relationship-type).
- *The fourth condition for paradox* referenced in the project instructions. Resolved: the "four" refers to the four

relationship-type stages (§6), not to four conditions on paradox itself. The conditions on paradox itself remain three (actuality, unpreventability, internal/external determinacy, explicit in §2); the fourfold structure is at the \*site of operation\* — the four relationship-type stages within which paradox and hypodox operate with characteristically different results.

- \*Compression and rarefaction regimes\* referenced in the project instructions. Resolved: the constructive reading offered in the previous draft — paradox as compressive, hypodox as rarefactive — is correct in spirit but loose in vocabulary. The proper terms are:

- Paradox: \*\*extrinsic overdetermination\*\*, properly described as a \*constraint from extrinsic relationships\*.

- Hypodox: \*\*intrinsic underdetermination\*\*, properly described as an \*opportunity or freedom for intrinsic resources, the relationships of parts\*.

The compression/rarefaction language can survive as informal shorthand or as imagery (the gas analogy is genuinely illustrative), but the constraint/opportunity pairing is what bears the structural weight. This vocabulary aligns with the Mandala stage analysis (§6), which talks of inner versus outer relata, and with the dual-engine asymmetry (§7).

- \*The exact relation between the dual engine and downward causation.\* Resolved in §7: paradox-side produces downward causation by the new dimension on its parts; hypodox-side has no such analogue because there is no new dimension to do the constraining. The hypodox-side produces \*configurational

relaxation\* — internal rearrangement under relaxed constraint — rather than downward causation. The asymmetry is principled, not embarrassing.

- \*Rotation: weak or strong?\* Resolved in §9.

- \*Photons in the taxonomy.\* Addressed in §9.

### ### Still open

- \*\*Eldridge-Smith engagement at full depth.\*\* The 2025 \*Generic Definitions\* paper supplies the formulations Virtualism adopts (§3). The remaining work is to set out, point by point, the move from his semantic/logical domain to Virtualism's ontological domain — what the extension claim depends on, what it does not, and how it sits in relation to his duality-squares work (2022, 2023).

- \*\*The four-stage transitions need finer work.\*\* Stage 1 → 2 is in place (sameness forced into difference by paradox, producing a new dimension — gravity at stage 2). Stage 2 → 3, stage 3 → 4, and the cycle-closing 4 → 1 are partly schematic. The Virtualist commitment to a priori derivability (see §6) means these transitions should be resolvable from the nature of virtual relationships alone; doing the resolution is open work. Candidate readings exist for the missing transitions — stage 2 → 3 driven by the asymmetry between shared external dimension and unshared internal contents; stage 3 → 4 driven by the new relata-type of whole-to-whole relationships — but these are reconstructive rather than derived. Likely belongs in a dedicated `mandala\_framework.md` or `architecture\_chain.md` rather than in

this thread.

- **Whether the unification of causation and emergence needs its own working document.** Probably yes. The argument in §8 is compressed; unfolding it requires going through the standard theories of causation in detail.
- **Kim's overdetermination objection** at full extension. The reply in §12 is a sketch; the detailed argument needs writing.
- **Hypodox and probability.** The connection between hypodox-admissibility-measures and quantum-mechanical wave functions is structurally suggestive but technically unworked. Worth a separate note. With the Mandala stage-3 analysis in place (substitution-with-conservation), this looks more tractable than it did.

## ## 14. Status and for the Acta paper

### ### Status

The position is firm. The foundations are in place; paradox and hypodox are characterised; strong and weak emergence are grounded in them; the four relationship-type stages locate the mechanisms; the dual engine's asymmetry is registered; the unification with causation is registered; the taxonomy is working. A summary paragraph for command:

- > \*Virtualism's engine of becoming is dual: paradox (incompatibly
- > overdetermined internal/external truth-values) forces strong

> emergence — the production of a new dimension. Hypodox  
> (underdetermined truth-values) permits weak emergence — the  
> selection of one admissible arrangement among many, within existing  
> dimensions. The dual engine has a principled asymmetry: paradox  
> produces structure (and the downward causation that goes with it);  
> hypodox redistributes within structure, producing configurational  
> relaxation under relaxed constraint rather than any new dimension.  
> Paradox and hypodox operate within four relationship-type stages  
> — sameness, difference, separation, whole — locating gravity at  
> stage 2 and acceleration at stage 4. The framework is committed to  
> the in-principle derivability of these stages from the nature of  
> virtual relationships alone; the present state of that derivation  
> is partial. The same engine accounts for causation, change, and  
> ontological novelty. Lawful necessity and probabilistic openness  
> are both present in the same universe because both regimes —  
> paradox and hypodox — operate on different structural situations  
> within the single ontology of virtual facts.\*

### ### For the Acta paper

The paper's working title — \*Paradox Is the Engine of Strong Emergence\*  
— remains correct. The hypodox apparatus is constructive material for  
the paper, but the paper does not need to do it justice. The paper  
needs to do \*paradox-side\* justice.

The strongest structure, given what is in the foundations + this  
document:

1. Properties as virtual facts (foundations §3).
2. Internal/external relationships (foundations §1, §2).
3. Paradox as discrepancy between internal and external truth-values

(this document §2).

4. The three conditions for generative paradox (§2).
5. Strong emergence as the necessary resolution: a new dimension (§5).
6. Worked case: four-as-first-paradox-square OR rest-mass-as-Tardis (§§9–10).
7. Dismissal of Wilson's structurally-empty alternative (§12).
8. Brief footnote on hypodox-side completeness (paragraph from §3).
9. Brief footnote on the unification with causation (paragraph from §8).

The Cantor extensions stay out of the paper per command's standing caveat.

The paper does not need to do everything Virtualism does. It needs to establish the engine. The dual-engine framing belongs to the book.

### ### Candidate aphorisms

For the bank:

- "Paradox is the engine of strong emergence." (Diary 064A, 30 April 2025 — also the paper title.)
- "Hypodox permits what paradox forces." (New, this document — worth flagging as candidate aphorism.)
- "Relax — even in matter." (Constructed, May 2026, from the Tai-Chi annotation to the hypodox mechanism — §7. Compresses the entire hypodox side of the dual engine into a single instruction. Flagged as candidate; the formulation may want refining.)
- "Strong emergence is the creation of a new dimension, and only

- paradox has such godlike powers." (Diary 062A, 7 November 2025.)
- "Emerging and demerging is change." (Diary 064A, 30 April 2025.)
  - "There is only one possibility for causation, and it is one and the same as the explanation of emergence. This is the engine of everything." (Diary 062A, 21 November 2025.)
  - "Only unpreventable paradox actually has creative power." (Diary 053B, 21 August 2023.)
  - "Self-reference can never produce an answer, because it is a recursive call." (Diary 52.)
  - "QM = emergence; GR = downward causation." (Diary 059A, 1 February 2025.)
  - "Everything is no more than an arrangement of numbers in a state of indecision." (Diary 062B, 13 December 2024.)

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\*Next thread to take up: probably `nothingness_and_beginning.md`, which gives the bootstrap argument that earns the foundations' assumption of at least one existent, and supplies the cleanest first instance of the paradox mechanism. After that, `numerogenesis.md` will be the cleanest demonstration tribunal for the whole engine, and the remaining threads (`time`, `gravity_and_space`, `core_ontology`) will largely be applications of the foundations + paradox/hypodox apparatus to the specific cases.\*