1 THE OBSERVER FROM QUARK TO CONSCIOUSNESS: ODTOE AND EVOLUTIONARY EPISTEMOLOGY

1.1 Why the observer ≠ human, what existed before life, and how conscious context choice works without magic

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1.1.1 ABSTRACT

The article addresses three fundamental objections to ODTOE: (1) if observer = human, the theory is anthropocentric and contradicts evolutionary biology; (2) what existed before the emergence of organic life — who "observed" for 5+ billion years? (3) Ashby's law of requisite variety forbids a system to describe a higher-order system — is a "theory of everything" possible? It is shown that ODTOE is *not* anthropocentric: by P1, an observer is any object, from a quark to a galaxy. Evolution is formalized as growth in dimensionality d and increasing complexity of cognitive coherence B, rather than "appearance of an observer from nothing." Before life existed, atoms observed — elementary strange loops [3]. Ashby's law is consistent with ODTOE Assertion 3 ($S = 1$ is unattainable): complete description is impossible, but the architecture of interaction is describable. A precise connection is established between the "conscious context choice" paradigm (Sapolsky, Dawkins) and ODTOE formalism: self-management of one's own operator = $\hat{O}(\hat{O}) = \hat{O}'$ — not magic, but a mechanism for increasing B through context.

Keywords: observer, evolution, anthropocentrism, dimensionality, quark, atom, consciousness, context, free will, Ashby, Sapolsky, ODTOE.

1.2 I. THREE OBJECTIONS

1.2.1 1.1. First objection: anthropocentrism

If observer = human, the theory repeats the error of geocentrism: placing us at the center. Genetically we differ from chimpanzees by ~1.2%. The prefrontal cortex — a "recent invention" of life (~2 million years out of 3.8 billion). Throughout the history of science, theories based on human uniqueness and centrality have led to dead ends: geocentrism → heliocentrism → a universe without a center.

1.2.2 1.2. Second objection: before life

5+ billion years the Earth existed without organic life. 10 billion years the Universe existed without planet Earth. Who "observed"? If observer = living being — who constituted configurations before life appeared? Stars formed, galaxies rotated, chemical reactions proceeded — without a single "observer" in the conventional sense.

1.2.3 1.3. Third objection: Ashby's law

The law of requisite variety (Ashby, 1956): a regulator must possess variety no less than the regulated system. Consequence: a lower-order system cannot *completely* describe a higher-order system. If we are part of the Universe, can we create a "theory of everything" for it?

1.2.4 1.4. Alternative paradigm (opponent's position)

A position requiring response: there is no free will (Sapolsky), we are biological robots (Dawkins). But one can *program reality* by CONSCIOUSLY selecting CONTEXTS. Morning exercises → cold shower → dopamine expression → search-setting → increased probability of events. This is not "quantum wavefunction collapse" — it is self-management of a system of biological agents. And precisely in this consciousness — HUMANITY.

1.3 II. FIRST ANSWER: OBSERVER ≠ HUMAN

1.3.1 2.1. What ODTOE says

Postulate P1 [1]: **"any object can act as an observer."** Formally: observer $O_i = (B_i, A_i, H_i)$ — a state vector, not limited to biological substrate.

An electron observes [3]. An atom observes [3]. Cesium-133 constitutes time [5]. A bacterium observes — with dimensionality $d = 1$. A tree observes — phototaxis, gravitaxis. An ant colony observes — through collective coherence (P5). A human observes — with $d = 3 - 4$.

The architecture is one: $R = \hat{O}(\Psi)$ at each level. The difference is in *dimensionality* d and *complexity* B.

1.3.2 2.2. Evolution = growth of d and increasing complexity of B

Epoch	Observer	d	Components of B	What "sees"
13.8 billion years ago	Quarks, elementary particles	-1 — 0	F (interaction), Λ (stability)	Nearest neighbors

Epoch	Observer	d	Components of B	What "sees"
10 billion years ago	Atoms, molecules	0 — 1	F, Λ, beginnings of E (chemical affinity)	Chemical gradients
3.8 billion years ago	Cells (prokaryotes)	1	F (chemotaxis), E (response to environment), Λ (memory through DNA)	Immediate environment
1.5 billion years ago	Eukaryotes	1 — 2	F, E, $(1-\sigma)$ (intracellular coordination), Λ	Broader environment
600 million years ago	Multicellular	2	All four, but $(1-\sigma)$ = coordination between cells	Macroscopic world
500 million years ago	Nervous system	2 — 3	All four, F = directed attention	Objects, predators, prey
300 thousand years ago	Homo sapiens	3 — 4	Complete $B = F \cdot E \cdot (1-\sigma) \cdot \Lambda$	Abstractions, time, self
Now?	Homo sapiens + AI	$4+$?	$B_{joint} = \iota_{human} \circ \hat{O}_{AI}$ [8]	Architecture of observation (ODTOE)

1.3.3 2.3. Prefrontal cortex — not "invention of observation"

Observation *existed* from the first atom. The prefrontal cortex — an extension of the operator's d, giving $\hat{O}(\hat{O})$ (self-observation, reflection, metacognition). This is not "appearance of an observer" — but *recursion*: an observer capable of observing *its own observation*.

An amoeba observes ($d \approx 1$): distinguishes a gradient and moves toward food. This is $\hat{O}(\Psi) = R$ — without neurons, without cortex, without "consciousness" in the human sense. A human does the same, but with $d = 3 - 4$: distinguishes *abstract* gradients (values, goals, meanings) and moves toward them.

1.3.4 2.4. Why this is not anthropocentrism

Anthropocentrism: "Humans are a unique/central observer." ODTOE: "Humans are one level Ψ_d^* in a continuum that began with quarks." Not at the center, but *a point on the spectrum*.

Analogy: temperature 36.6°C is not "unique" and not "central." It is one point on a scale from absolute zero to billions of degrees. But at precisely this temperature, *specific* biochemistry

works. So with $d = 3 - 4$: not "the center of the Universe," but *the dimensionality at which* $\hat{O}(\hat{O})$ is possible.

1.4 III. SECOND ANSWER: BEFORE LIFE, ATOMS OBSERVED

1.4.1 3.1. Atom — elementary strange loop

By [3]: atom = minimal self-consistent configuration $\Psi^* = \Phi(\Psi^*)$. Triple architecture:

Component	Subatomic particle	ODTOE role
Observable	Proton (+1, stable)	$R \in \mathcal{C}$ — configuration
Observer	Neutron (0, unstable alone)	$O = (B, A, H)$
Operator	Electron (-1, delocalized)	$\hat{O} : \mathcal{H} \to \mathcal{C}$

Verified across 9 independent parameters [3]: proton stability, free neutron instability, neutron stability in nucleus, electrical neutrality, electron delocalization, mass ratios, quark structure, discrete spectrum, antineutrino.

1.4.2 3.2. 5 billion years before life

This is not "a dead world waiting for an observer." This is a world where $\sim 10^{80}$ atomic observers *already* constitute configurations. Their $d = 0$, their B is minimal — but their *number* is colossal.

By P5.1: $P_{coll}(E) = 1 - \prod_{i=1}^{n}(1 - B_i^k)$. At $n \sim 10^{80}$ even with tiny B_i collective probability of stable configurations $\to 1$. Stars formed, galaxies rotated, elements synthesized — all of this *configurations*, co-constituted by atomic observers.

1.4.3 3.3. Who set the gradients?

Gradient — $\nabla U(C)$ in the reconfiguration equation [1, formula 4.4]:

$$\frac{dC}{dt} = -\frac{\alpha}{I(C) + \varepsilon}\nabla U(C) + \eta(t)$$

The potential $U(C)$ is determined by the *structure of the field* $\mathcal{H}$, not by an external agent. As a gravitational gradient is determined by mass distribution (without "someone setting it"), so $\nabla U(C)$ is determined by the *topology* of $\mathcal{H}$.

Gradients are not set externally, but *emergent*: they arise from collective observation. There is no "conductor." There are 10^{80} observers whose collective coherence forms stable configurations. Self-organization, not design.

1.4.4 3.4. Chronology of observation

13.8 billion years	Big Bang = first Φ: Ψ* = Φ(Ψ*) at Universe scale
13.8 – 13.5	Primordial nucleosynthesis: quarks → nucleons → atom
	Observers: ~10^80 atoms with d = 0
10 billion years	Stars: nucleosynthesis of heavy elements
	Observers: atoms with d = 0, stars as clusters S > S
5 billion years	Solar system: from supernova remnants
	Observers: molecules with d = 0-1
4.5 billion years	Earth: planetary cluster of coherence [7]
	Observers: ~10^50 atoms
3.8 billion years	First cell: d = 0 → d = 1. DIMENSIONALITY LEAP
	Observer first "sees" environment, not just neighbor
600 million years	Multicellularity: d = 1 → d = 2
	Coordination of observers within organism
300 thousand years	Homo sapiens: d = 3-4. Ô(Ô) – self-observation
	First observer capable of observing its own observat
Now	ODTOE: observer describes architecture of observatio
	Strange loop: Ψ* = Φ(Ψ*) at meta-level

1.5 IV. THIRD ANSWER: ASHBY'S LAW AND LIMITS OF DESCRIPTION

1.5.1 4.1. Ashby's formulation

The law of requisite variety (1956): "Only variety can destroy variety." Formally: the number of possible states of the regulator must be no less than the number of possible states of the regulated system. Consequence: a system *inside* the Universe cannot *completely* describe the Universe.

1.5.2 4.2. ODTOE agrees with Ashby

Assertion 3 [1]: ODTOE belongs to the set of theories T, whose cardinality it itself defines: $T_{ODTOE} \in T$ and $T_{ODTOE} \vdash |T|$. This is a strange loop — not a contradiction, but *structural incompleteness*. Consequence: $S = 1$ **is unattainable**. Complete coherence is a regulative ideal, not a final state.

By Ashby: we cannot *completely* describe a system of which we are part. By ODTOE: $S = 1$ is unattainable → complete description is impossible.

Two statements — the same thing in different words.

1.5.3 4.3. What is possible

We cannot describe *everything*. But we can describe the *architecture of our interaction* with a system. This is what ODTOE does:

What ODTOE describes	What ODTOE *does not* describe
Architecture of observation ($R = \hat{O}(\Psi)$)	Specific physical constants
Mechanism of coherence (S, B, P_{coll})	Specific configurations (which exactly R)
Hierarchy of dimensionalities ($d = 0, 1, 2, ...$)	Specific observers (who exactly O_i)
Limits of description (Assertion 3)	Content *beyond* the limits of description

ODTOE is not a "theory of everything" in the sense of "a formula describing every atom." It is a **metatheory**: describes *how* description works, not *what* is described.

1.5.4 4.4. Evolutionary gradients instead of "theory of everything"

Opponent's position: "Through simulation we can understand how our species evolutionarily interacts with the world and develop better strategies."

Through ODTOE: *precisely this*. Not "theory of everything," but **theory of observer interaction with the field of potential states**. Evolutionary gradients are $\nabla U(C)$: directions in which coherence grows, configurations become more complex, dimensionality d increases. Not "grand design," but *gradient ascent* in the landscape of possibilities.

1.6 V. CONSCIOUS CONTEXT CHOICE = ODTOE IN ACTION

1.6.1 5.1. The "biorobot with self-management" paradigm

Sapolsky (Determined, 2023): free will as *causa sui* does not exist. Every decision is the result of genes, hormones, environment, experience. Dawkins (The Selfish Gene, 1976): we are machines for gene survival.

ODTOE *does not contradict*: $\hat{O}$ is determined by (B, A, H) — coherence, archetype, history. Not "free choice from nowhere." Every act of observation is the result of *the entire history* of the observer.

But — and this is key — $\hat{O}(\hat{O}) = \hat{O}'$. An observer that has directed $\hat{O}$ at *itself changes*. Not "freely" (not from nowhere), but *recursively*: through awareness of one's own limitations.

1.6.2 5.2. Precise map of "morning sequence"

Action	Component of B	Biological mechanism	ODTOE formulation
Decision to rise	$(1-\sigma)\uparrow$	Prefrontal cortex suppresses amygdala	Alignment of internal decision with action
Plank (1 min)	$F\uparrow$	Activation of dorsal attention network	Focus gathered, operator directed
Cold shower	$E\uparrow$	Noradrenaline + dopamine, HRV-coherence	Emotional mobilization
Search-setting	$\Lambda\uparrow$	Dopamine reward system	Experience: "I did this and it works"
Total effect	$B\uparrow$	**Sympathetic-parasympathetic balance**	$P(E\|\|B)=B^k\uparrow$

1.6.3 5.3. Why this is not magic and not "quantum wavefunction collapse"

The morning sequence does not "change reality by force of thought." It *increases the coherence of the operator*, which *increases the probability* of certain configurations.

Mechanism:

Step 1. $B\uparrow \to P(E|B)=B^k\uparrow$. Probability of target outcomes grows.

Step 2. Higher B means: more precise F (notice opportunities), higher E (emotionally engaged), lower σ (no internal conflict), higher Λ (act from experience).

Step 3. These four components *physically manifest*: dopamine (search), noradrenaline (alertness), cortisol-balance (no burnout), BDNF (neuroplasticity).

Step 4. Physical state determines *real behavior*: what you notice, how you react, what decisions you make, who you interact with.

Step 5. Behavior forms *real results*: not through "quantum magic," but through *increased probability of target actions*.

The chain is completely materialistic. No "wavefunction collapse in meditation." There is: **self-management of one's own operator through context** → change in B → change in probabilities → change in behavior → change in results.

1.6.4 5.4. Free will: reframing

Classical framing	Sapolsky's answer	ODTOE's answer
Is there free will?	No. Everything is determined by genes + environment + history	The question is incorrectly framed
What is there instead?	Illusion of choice	$\hat{O}(\hat{O}) = \hat{O}'$: recursive reconfiguration
Can one "manage"?	Yes — through understanding biology	Yes — through conscious context choice (F, E, σ, Λ)

ODTOE does not say "free will exists." ODTOE says: **an observer that understood its own structure can *recursively reconfigure* its operator**. Not "from nowhere" (that would be magic), but *through* understanding limitations. Not *causa sui*, but $\hat{O}(\hat{O})$.

Sapolsky is right: "free will" as spontaneous, unconditional decision — does not exist. But there is *recursion*: $\hat{O}(\hat{O}) = \hat{O}'$ — observation of one's own observation, changing the observer. And this recursion is *not* an illusion. It has neurophysiological correlates (prefrontal cortex), evolutionary history (growth of d), and measurable consequences (change in B).

1.6.5 5.5. Humanity = $\hat{O}(\hat{O})$

Opponent: "It is precisely in this consciousness that I see HUMANITY."

Through ODTOE: **exactly**. Humanity is not "possession of a soul" and not "uniqueness of species." Humanity = $\hat{O}(\hat{O})$: the ability to observe one's own observation and *change it*. An amoeba cannot do $\hat{O}(\hat{O})$ — its d is too small. A chimpanzee — partially (mirror test, but not metacognition). A human — fully.

But this is *an evolutionary gradient*, not *a binary leap*. A chimpanzee is closer to $\hat{O}(\hat{O})$ than an ant. A dolphin is closer than a fish. A human — *at present* — is farther along d. But not "uniquely" and not "forever."

1.7 VI. WHAT ODTOE DOES NOT CLAIM

For complete honesty ($\sigma \to 0$):

ODTOE **does not** claim	Why
Humans are the center/apex of the Universe	P1: any observer, from quark to galaxy
Thought magically creates reality	B is probability, not certainty. Mechanism through behavior
"Quantum wavefunction collapse" in meditation	Mechanism through $B \uparrow$, not quantum magic
We can describe "everything"	Assertion 3: $S = 1$ is unattainable. Ashby confirms

ODTOE **does not** claim	Why
Free will exists as *causa sui*	$\hat{O}$ is determined by (B, A, H). There is recursion, not spontaneity
Only the living observe	An atom observes [3]. Observation = $R = \hat{O}(\Psi)$, not "consciousness"

ODTOE claims	Formula
Observer is any object	P1
Conscious context choice increases B → increases $P(E\|\|B)$	D1.1 + P4.1
Evolution = growth of d and increasing complexity of B	Chronology of observation (Section III)
Complete description is impossible	Assertion 3, Ashby's law
Humanity = $\hat{O}(\hat{O})$	Recursion of dimensionality
$\hat{O}(\hat{O}) = \hat{O}'$ — recursive reconfiguration, not magic	Self-observation

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1.8 VII. CONCLUSION

1.8.1 7.1. Answers to three objections

Observer ≠ human. Observer is any object, from quark to galaxy. Evolution is growth of d and increasing complexity of B. Humans are one point on the spectrum, not the center.

Before life, atoms observed. 10^{80} atomic observers constituted configurations 10+ billion years before the first cell. Gradients are emergent, not set externally.

Ashby's law holds. $S = 1$ is unattainable. Complete description is impossible. But the architecture of interaction is describable. ODTOE is a metatheory, not "a formula on a t-shirt."

1.8.2 7.2. Synthesis

The "conscious context choice" paradigm (Sapolsky + Dawkins + neuroscience) and ODTOE formalism are *the same thing* in different languages:

- "No free will" = $\hat{O}$ is determined by (B, A, H)
- "Conscious context choice" = $\hat{O}(\hat{O}) = \hat{O}'$ (recursive reconfiguration)
- "Self-management of biological agents" = $\hat{O}_{d=3}$ manages cluster $\{\hat{O}_{d=1}\}_{cells}$ through $S_{organism}$
- "In consciousness — humanity" = Humanity = $\hat{O}(\hat{O})$

1.8.3 7.3. Evolutionary gradient

Not "theory of everything," but theory of *evolutionary gradient of observation*:

$$d_{-1} \to d_0 \to d_1 \to d_2 \to d_3 \to d_4 \to ?$$

Quarks → atoms → cells → organisms → societies → ? At each level the same architecture ($\hat{O}$, Ψ, R), the same loop (Φ), the same fixed point (Ψ^*). But with growing d and increasingly complex B.

Where the gradient leads further — an open question. By Ashby — we cannot know *completely*. But we can *move along the gradient*, consciously increasing B through context choice. And *this* is not magic, not religion, not numerology. This is **self-management of one's own operator in the evolutionary landscape of possibilities**.

$\hat{O} \neq$ human. $\hat{O}(\hat{O}) =$ consciousness. $S = 1$ unattainable. Not magic — self-management through conte

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