Record-Based Ontology (RBO) as a BCT-Derived Individuation Framework

Individuation, Continuity, and Definiteness Without Primitive Overcounting

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Status note: philosophical/programmatic version. No new physical dynamics claimed. RBO is treated here as a BCT-derived framework of individuation, not as a completed autonomous physical ontology.

Abstract

This paper reframes Record-Based Ontology (RBO) as a BCT-derived framework for individuation. Its central aim is not to offer a complete physical theory of reality, nor to replace Bit-Collapse Theory (BCT), nor to derive the formal structure of quantum mechanics. Its more limited claim is that finite systems require criteria of individuation: not every physical difference automatically individuates a fact, self, outcome, or observer-world for a finite record-bearing system.

RBO begins from the BCT insight that experienced definiteness is not a primitive global fact but an agent-relative structure. In BCT, what becomes definite for an agent is not the universal wavefunction as such, but the agent-relative equivalence class of global configurations compatible with the agent's accessible informational and record structure. RBO generalizes this insight cautiously: records do not create reality, and they are not identical with facts; rather, records are stabilized physical or informational structures through which differences become definite, inherited, and update-constraining for finite systems.

The core RBO constraint is anti-overcounting: do not count facts, selves, outcomes, or observer-worlds more finely than the record-constituted differences that make them difference-making for finite systems. This is not intended as a new dynamics, nor as a theory of subjective world-creation. It is an individuation constraint on when physical multiplicity becomes fact-, subject-, outcome-, or world-making relative to finite systems.

The framework distinguishes physical difference, trace/correlation, record, fact-for-a-system, and truth/accuracy. It also distinguishes recordhood from representational success: false records are real as records while failing as representations. RBO therefore aims to function as a fallibilist record-realism and as a philosophical extension of BCT's equivalence-class approach to definiteness.

Keywords: Record-Based Ontology; RBO; Bit-Collapse Theory; BCT; individuation; records; definiteness; anti-overcounting; personal identity; measurement problem; observer-worlds; false records; Everettian branching.

1. Introduction

Record-Based Ontology (RBO) is proposed here as a philosophical framework for thinking about individuation, continuity, and definiteness in finite systems. It emerged from the development of Bit-Collapse Theory (BCT), especially from the attempt to understand quantum measurement without objective collapse and without treating observer-worlds as primitive entities.

The guiding question is:

When does a physical difference count as a fact, a self, an outcome, or an observer-world for a finite system?

Ordinary language treats such entities as already individuated. We speak of one person, one fact, one memory, one outcome, one world, one past. But these categories require criteria of distinction and continuity. A physical system may contain countless microphysical differences that make no difference to an agent. A person may wake and identify itself with the subject who fell asleep, although no primitive ego-substance needs to have persisted. A measurement may produce a stable outcome for an apparatus or observer without requiring a global physical collapse. A record may exist and constrain later inquiry while being false as a representation.

RBO gives these cases a common structure. It does not ask only what exists in the broadest physical sense. It asks what makes something count as a definite item for a finite record-bearing system. The answer is not consciousness, belief, language, or subjective report. The answer is record-structured individuation.

However, this claim must be stated carefully. RBO is not the claim that records are facts. Nor is it the claim that whatever is recorded is true. Nor is it the claim that records create reality ex nihilo. A record is a stabilized physical or informational structure through which a difference becomes accessible, persistent, and update-constraining for some finite system.

Thus, the safest one-sentence formulation is:

RBO is not the claim that records create reality; it is the claim that finite definiteness requires record-constituted individuation.

Or, in its anti-overcounting form:

Do not count facts, selves, outcomes, or observer-worlds more finely than the record-constituted differences that make them difference-making for finite systems.

This anti-overcounting principle is the distinctive core of RBO. Without it, RBO risks becoming merely a vocabulary of stable records. With it, RBO becomes a constraint on ontological individuation.

2. Scope and Dependence on BCT

RBO is BCT-derived. It should not be read as replacing BCT or as supplying, by itself, a complete theory of quantum measurement.

BCT is the more physics-facing framework. Its central proposal is that experienced definiteness is an agent-relative equivalence-class phenomenon. The world experienced by an agent A is not the universal wavefunction as such, nor a primitive branch-label, but the class of global configurations that are indistinguishable to A given A's accessible informational and record structure. A collapse is not a physical reduction of the wavefunction; it is an update of the agent-relative equivalence class when a new record-constituting difference becomes integrated.

RBO generalizes this structure to other philosophical problems: personal identity, subject-multiplication, false records, observer-world counting, and facthood. But the generalization must remain disciplined. Detached from BCT's equivalence-class framework, RBO can appear too broad or merely definitional. Its strongest role is therefore not as an autonomous grand ontology, but as a BCT-derived framework for record-based individuation.

In short:

- BCT: experienced definiteness as agent-relative equivalence-class update.
- RBO: a broader individuation framework based on the same anti-overcounting logic.

RBO's value depends on whether it produces non-trivial constraints on individuation. It is not enough to say that finite systems depend on records. The framework must show why certain forms of ontological counting are illegitimate without record-constituted difference.

3. Terminological Clarifications

The expression "Record-Based Ontology" is descriptive. It names the author's BCT-derived framework of individuation by records. It is not intended to claim exclusive ownership over all possible uses of "record-based" language in philosophy, physics, archival theory, information science, or metaphysics.

The following distinctions are essential.

3.1 Physical difference

A physical difference is any difference in the underlying physical or informational structure of reality. RBO does not deny such differences. It denies only that every physical difference automatically individuates a fact, self, outcome, or observer-world for every finite system.

3.2 Trace or correlation

A trace or correlation is a physical relation in which one structure carries information about another. Not every trace is a record in the relevant RBO sense. A transient correlation that is immediately erased or cannot constrain future states may fail to individuate anything for a finite system.

3.3 Record

A record is a stabilized physical or informational structure capable of persisting, being accessed, and constraining later states within a relevant domain or system. Records may be neural, bodily, environmental, instrumental, archival, digital, social, or thermodynamic. They need not be consciously noticed. They need not be linguistically represented. They need not be true in the representational sense.

3.4 Fact-for-A

A fact-for-A is not identical with a record. It is the status a difference acquires when it is made definite for A through A's accessible, persistent, update-constraining record structure.

Thus:

A record is not a fact. A record is a structure through which a difference becomes fact-relevant for a finite system.

3.5 Truth and accuracy

Truth or representational accuracy concerns whether a record successfully tracks what it purports to represent. A false record is still real as a record, even if it fails as a representation.

This hierarchy prevents circularity. RBO should not say: fact = record. It should say: fact-for-A = a difference individuated for A through accessible, persistent, update-constraining record structure.

4. The Foundational Constraint: RBO-0

The framework can be introduced through a foundational constraint rather than a mere definition.

RBO-0. For any finite record-bearing system A, what counts as a definite fact, self, outcome, or observer-world for A is individuated by the stable records accessible to A, persistent across A's relevant integration window, and capable of constraining A's subsequent updates.

This principle contains five essential components.

First, the system is finite. RBO is not written from the imagined standpoint of an unlimited intellect surveying the total physical state of the universe. It concerns systems with limited access, finite resolution, bounded memory, and temporally structured integration.

Second, the system is record-bearing. It must be capable of carrying stabilized differences that can persist and constrain later states. A record-bearing system need not be conscious. A detector, memory register, organism, archive, institution, or scientific instrument can bear records in the relevant structural sense.

Third, definiteness is relative to accessible record-structure. This does not make definiteness arbitrary or merely subjective. Accessibility is a physical relation: a difference must be coupled to the system's channels of retention, integration, discrimination, or update. A difference that never enters any such structure may be physically real in a broad sense, but it is not yet definite for that system.

Fourth, records must persist across a relevant integration window. A vanishing fluctuation that leaves no retained structure does not individuate a stable fact, subject, or outcome. The relevant window depends on the system: neural integration, instrumental memory, archival persistence, environmental redundancy, or other physical retention structures.

Fifth, records must be update-constraining. A record matters because it changes what later states can inherit, expect, compare, correct, or act upon. Definite facts are not bare labels. They are stabilized differences that enter causal, inferential, practical, or experiential continuation.

RBO-0 therefore does not define reality as such. It defines a constraint on finite definiteness:

A physical difference becomes definite for A when it enters A's stable, accessible, update-constraining record structure.

This is an individuation constraint, not a new dynamics.

5. What RBO Is Not

Because the language of records can be misunderstood, several negative clarifications are necessary.

5.1 RBO is not subjective idealism

RBO does not say that consciousness creates the world. A record is not a private mental act. Records are physical or informational structures with causal histories and stability conditions. A fossil, a detector click, a scar, a database entry, a memory trace, a legal document, or a redundant environmental encoding can be a record. Consciousness is one possible site of record integration, not the source of reality.

5.2 RBO is not crude constructivism

RBO does not say that whatever is recorded becomes true. Recordhood and truth are distinct. A forged document, false memory, corrupted file, or faulty measurement can be real as a record while false as a representation. Records make truth and error possible because they stabilize differences that can later be checked, corrected, defeated, or reclassified.

5.3 RBO is not mere epistemology

RBO is not only a theory about what agents know. It concerns what individuates facts, selves, outcomes, and observer-worlds for finite systems. The issue is not simply ignorance. It is whether a physical difference has entered the record-structure that makes it a definite difference for the system in question.

5.4 RBO is not a new physical dynamics

RBO does not introduce a collapse law, hidden variable, stochastic reduction mechanism, or modification of quantum mechanics. Its central claim is ontological and individuative: it concerns when physical differences count as definite items relative to record-bearing systems.

5.5 RBO is not a complete standalone ontology

RBO should not be presented as a complete theory of physical reality. It is better understood as a framework of individuation derived from BCT. It becomes substantive only when it constrains ontological counting: facts, selves, outcomes, and observer-worlds should not be counted beyond record-constituted differences.

5.6 RBO is not primarily a theory of time

Some record-based approaches use records to explain temporal becoming or the growth of the past. RBO may be compatible with such approaches, but its core is different. RBO is not primarily a theory of time. It is an ontology of individuation by records.

6. Records, Equivalence, and Anti-Overcounting

RBO is naturally expressed through equivalence classes.

Two physical configurations may differ microscopically, environmentally, or globally while agreeing with respect to all records accessible, persistent, and update-constraining for a finite system A. In that case, they are physically distinct but equivalent for A at the level of definite fact-structure.

Conversely, when a difference enters A's relevant record-structure, prior equivalence breaks. The system now inherits a different record, updates differently, and occupies a different observer-relative fact-structure.

This yields the general RBO schema:

Two physical configurations belong to the same effective world for A when they agree with respect to A's stable, accessible, update-constraining records. They belong to distinct effective worlds for A when they differ with respect to such records.

This schema is not a denial of underlying physical multiplicity. It is a discipline on ontological counting. RBO does not claim that microphysical differences do not exist. It claims that microphysical difference is not automatically fact-, subject-, or world-making for finite systems.

The central operation is therefore quotienting: many physical realizations may instantiate the same record-constituted structure for A. What matters is not raw multiplicity, but multiplicity under the relevant individuation criterion.

This is why RBO resists gratuitous overcounting. If no subject-constituting record differs, why count multiple subjects? If no observer-world record differs, why count multiple observer-worlds? If no accessible, persistent, update-constraining difference exists for A, why treat the distinction as definite for A?

RBO answers:

Do not count beyond the records that individuate.

This is the point at which RBO becomes more than a terminology of stable records. It becomes a constraint against primitive identity, primitive persistence, and primitive world-counting.

7. Application I: Subject-Individuation

The first application concerns conscious subjecthood, especially in Everettian branching, duplication, or teleportation cases.

A physical theory may multiply realizers. It may describe multiple branch-relative structures, multiple copies, or multiple physical tokens. But physical token-multiplicity does not automatically imply subject-multiplicity. If subjecthood is individuated by informational or record-based configuration, then there is no multiplication of subjects without subject-constituting informational difference.

This can be stated as an Informational Identity Constraint:

If two alleged subject-states are identical in all subject-constituting informational or record-based respects, then they are not distinct subjects merely in virtue of location, tokenhood, branch-index, or external label.

This does not deny that there can be multiple physical realizers. Two systems can instantiate the same structure. The point is narrower: if conscious subjecthood is structurally or informationally individuated, then subject-counting must track subject-constituting structure, not bare realizer-counting.

This is not a crude stipulation that identical experiences are numerically one in every metaphysical sense. The weaker and more defensible claim is that external token-counting alone does not individuate distinct subjectivities if no subject-constituting record difference is present.

In Everettian terms, the relevant threshold is not the existence of branch structure as such, but the integration of branch-relative differences into subject-constituting record-structure. Once different outcome-records are integrated, distinct successor subject-states exist. Before that differentiation, branch labels alone do not constitute subject-relevant multiplicity.

RBO thus treats subject individuation as record-based:

Subjects multiply when subject-constituting records differ.

8. Application II: Personal Continuity and the Waking Self

The same logic applies diachronically.

Ordinary waking creates the impression that a numerically identical self simply persists through sleep, interruption, anesthesia, forgetting, and discontinuity. RBO deflates this picture. The self who wakes need not be a primitive metaphysical ego that has endured unchanged through interruption. The waking self is a later conscious configuration that inherits enough of the earlier configuration's subject-constituting record-structure to continue a coherent trajectory.

This yields the Record-Continuation Principle:

A later experiential configuration counts as an admissible continuation of an earlier one insofar as it inherits, preserves, and integrates enough of the earlier configuration's subject-constituting record-structure in the right way.

This principle avoids two extremes. It does not reduce the self to a bare body-token. Bodily and neural continuity matter because they usually preserve record-structure, not because matter by itself guarantees subject-continuity. But it also does not abolish the self. The self is real as an organized continuity of record-integrated configurations. What is rejected is only the stronger picture of a primitive ego-substance persisting over and above those records.

The ordinary self is therefore a narrative compression of record-continuity. It is not sheer illusion. It tracks a real structural relation. But the metaphysical image of one indivisible self-substance moving through time is more than the ontology requires.

This makes the synchronic and diachronic sides of RBO mirror images:

- no subject-multiplicity without subject-constituting record difference;
- no need for primitive self-persistence where record-continuity explains continuation.

Difference individuates; continuity continues. In both cases, records do the work.

9. Application III: Measurement and Observer-Worlds

RBO began from the pressure of the quantum measurement problem. The standard formulation asks how a linear quantum state yields a single definite outcome. That question is genuine, but it can hide a deeper one:

Under what conditions does a physical difference count as a definite outcome for a finite record-bearing system?

Decoherence and environmental redundancy explain why certain correlations become stable, robust, and effectively classical. They explain much of the physical architecture of record formation. But they do not by themselves settle the individuation question: which differences count as fact-, subject-, outcome-, or observer-world-making for a finite system?

RBO supplies an individuative criterion.

A definite outcome for A is a physical difference that has entered A's accessible, persistent, update-constraining record-structure. An observer-world for A is not a raw branch, a microphysical realization, or an arbitrary label. It is an equivalence class of physical configurations under A's relevant record-structure.

This gives a record-based answer to the residual problem of definiteness:

A physical difference becomes definite for A when it breaks equivalence within A's stable record-structure.

The proposal does not require objective collapse. The global physical state need not be mutilated. The update is not a magical event in consciousness. It is a change in the record-defined equivalence class of a finite system.

This also clarifies the relation between BCT and RBO. BCT is the quantum-foundational route into the problem: collapse is reinterpreted as record-defined class update rather than physical reduction. RBO is the broader philosophical framework: definiteness in finite systems is individuated by record-constituted differences.

10. Application IV: False Records and Fallibilist Realism

A record-based ontology immediately faces an objection:

If facts are record-structured, what about false records?

The naive answer would identify recordhood with truth. That answer must be rejected. A serious RBO must distinguish recordhood, representational accuracy, and inferential authority.

Recordhood is the existence of a stabilized structure capable of persisting, being accessed, and constraining later states. Representational accuracy is the success of that structure in tracking the state, event, or relation it is taken to indicate. Inferential authority is the entitlement of a record to guide belief, action, or inquiry within a broader network of records.

A false record is therefore not a non-record. It is a real record whose representational or evidential role fails.

A false memory is real as a present psychological record while inaccurate as a representation of a past event. A forged document is real as a document and as evidence of forgery while false as testimony from the alleged author. A faulty detector reading is real as a detector state while false as evidence of the intended target. A corrupted file is real as a bit-structure while failing to preserve the intended content.

This distinction protects RBO from relativism. Records do not make their contents true. They make contents available for stabilization, comparison, correction, defeat, and reclassification. Objectivity is not achieved by escaping records, but by building record-ecologies: networks of independent, corrigible, mutually constraining records.

The resulting position is fallibilist record-realism. It is realist because records are physical or informational structures constrained by the world. It is fallibilist because no finite record is self-certifying or immune from error.

11. Relation to BCT

RBO is BCT-derived, but not identical with BCT.

BCT begins from quantum measurement and the problem of definiteness. Its core idea is that there is no need for objective physical collapse if collapse is understood as a record-defined update in the equivalence class of global configurations relative to a finite agent. What becomes definite is not the universal wavefunction as a whole, but the record-constituted state available to a finite system.

RBO generalizes this insight.

The same structure appears in personal identity, subject-multiplication, observer-world counting, error, memory, and facthood. In each case, the issue is not only what physically exists, but what individuates the relevant ontological item for a finite record-bearing system.

Thus:

- BCT applies record-based individuation to quantum definiteness.
- RBO applies record-based individuation to facts, selves, outcomes, errors, and observer-worlds generally.

BCT remains the more physics-facing framework. RBO is the philosophical framework that makes the underlying individuation move explicit.

However, RBO should not obscure BCT's own formal open problem. If BCT treats the experienced world as an agent-relative equivalence class rather than as a Hilbert-space branch-vector, it must eventually explain how standard quantum dynamics, interference, and Born weights are recovered from, or represented within, such equivalence-class structure. RBO does not solve this Formal Bridge Problem. It clarifies the individuation side of the project.

12. Relation to Other Record-Based Approaches

The term "record-based ontology" is descriptive rather than proprietary. It may naturally arise in different contexts wherever records are assigned ontological importance. Some approaches may use records to explain time, becoming, closure, history, or the growth of the past. RBO, as defined here, has a narrower and more specific meaning.

RBO is not primarily a theory of temporal becoming. It is a theory of individuation. Its question is not first "how does the past grow?" but:

When does a difference count as a fact, self, outcome, or observer-world for a finite system?

This leaves room for dialogue with other record-centered frameworks. A theory of time may treat records as the realized traces through which the past is constituted. RBO treats records as the stable structures through which definiteness is individuated. These claims may be compatible, but they are not the same.

The distinctive formula of RBO is therefore:

No ontological individuation beyond record-constituted difference.

Or, more cautiously:

Do not count facts, selves, outcomes, or observer-worlds more finely than the records that make them difference-making for finite systems.

13. Limitations and Open Tasks

RBO, as presented here, is not a completed formal theory. Several limitations must remain explicit.

First, the notion of record requires context-sensitive operationalization. Neural records, instrumental records, archival records, environmental traces, and subject-constituting records do not all have the same persistence conditions. RBO provides a criterion-schema, not a universal numerical threshold.

Second, RBO does not derive record formation from unitary quantum dynamics. That task belongs to BCT and to the broader problem of connecting BCT-native informational equivalence to the standard quantum formalism.

Third, RBO's contribution is strongest when it constrains individuation. If it merely states that finite systems use stable records, it risks becoming trivial. Its non-trivial role is to block primitive overcounting of facts, selves, outcomes, and observer-worlds.

Fourth, RBO must be tested case by case against existing literatures: Parfitian reductionism and personal identity, Everettian branching, decoherence and Quantum Darwinism, relational quantum mechanics, epistemology of testimony and memory, and theories of scientific objectivity.

Fifth, the framework should remain subordinate to BCT where quantum measurement is concerned. RBO clarifies the individuation structure, but BCT supplies the more specific account of collapse as equivalence-class update.

14. Conclusion

RBO proposes a simple but carefully limited shift. Instead of treating facts, selves, outcomes, and worlds as primitively individuated, it asks what makes them count as such for finite systems. Its answer is record-constituted individuation.

A fact-for-A is a difference made definite for A through stable record-structure. A self is not a primitive substance but a record-integrated continuity. A subject multiplies only when subject-constituting records differ. A measurement outcome becomes definite when a physical difference becomes accessible, persistent, and update-constraining. An observer-world is an equivalence class under stable records. A false record is real as a record while false as representation.

This framework is neither idealist nor eliminativist. It does not deny physical reality. It denies that finite definiteness can be read directly from unstructured global physical multiplicity. It also denies that primitive identity, primitive persistence, or primitive world-counting should be accepted without individuation criteria.

The founding claim is therefore not that records create reality. It is that finite definiteness requires record-constituted individuation.

In its strongest form, RBO is an anti-overcounting principle:

Do not multiply facts, selves, outcomes, or observer-worlds beyond the record-constituted differences that make them difference-making for finite systems.

That is the role RBO can play within the broader BCT project.

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Note on AI Use

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