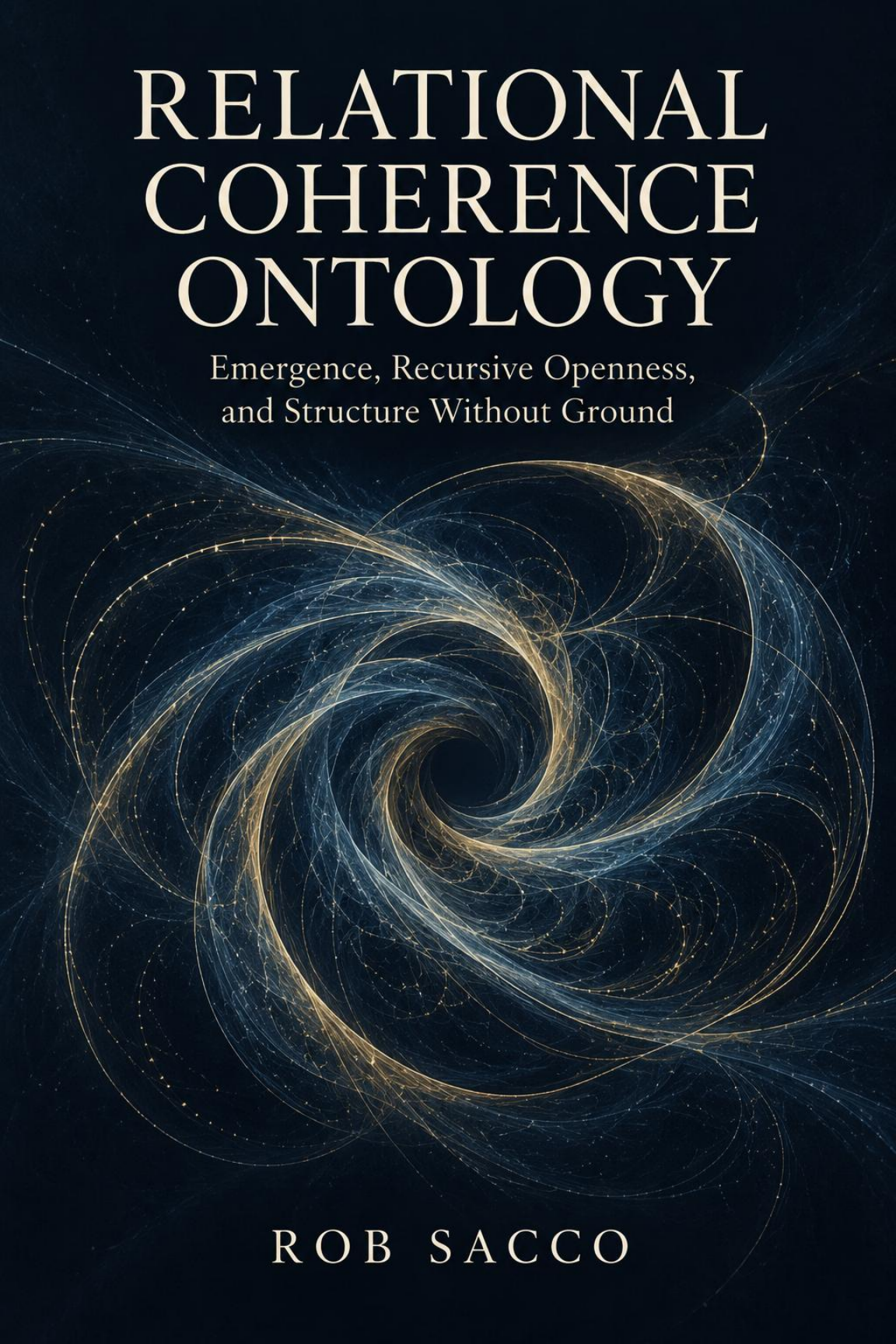
RELATIONAL COHERENCE ONTOLOGY

Emergence, Recursive Openness, and Structure Without Ground



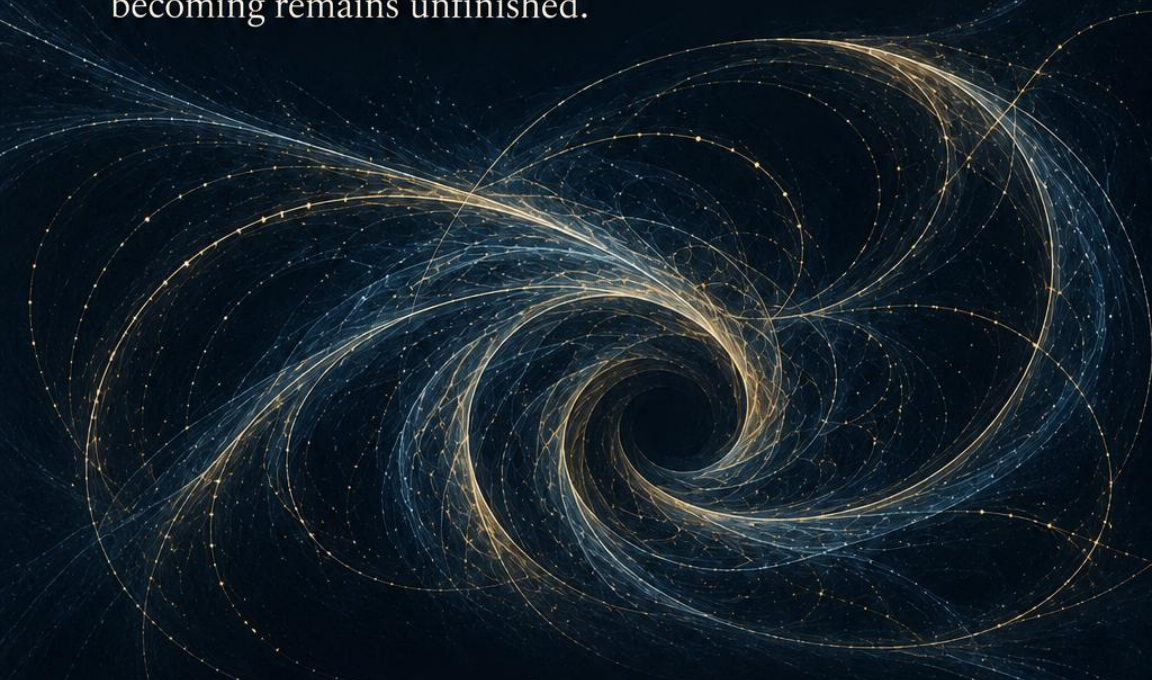
ROB SACCO

How can a changing world remain coherent?

A whirlpool persists even as its water changes. Could selves, minds, and worlds be understood in the same way?

Relational Coherence Ontology explores how stable forms emerge through relations, constraints, and ongoing activity. Rob Sacco develops a philosophical account of emergence, consciousness, meaning, and impermanence without appealing to a final metaphysical foundation.

From recursive openness to the reality of everyday commitments, this book asks what it means to inhabit a world whose stability is an achievement and whose becoming remains unfinished.



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Rob Sacco

2026

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Introduction

A whirlpool has a recognizable form. It persists, redirects water, and can be distinguished from the surrounding current. Yet its persistence does not depend on keeping the same water in place. What endures is an organization of movement sustained by conditions that can change. When those conditions disappear, the whirlpool disappears with them.

This book begins with the possibility that the whirlpool illuminates something broader about existence. Organisms exchange matter while maintaining themselves. Minds change while retaining patterns of memory and concern. Institutions outlive their participants because practices, expectations, and resources sustain an identifiable organization. In each case, continuity can belong to a process rather than to an unchanging core.

Relational Coherence Ontology, abbreviated RCO, develops this possibility into a philosophical framework. It proposes that entities are best understood as relatively persistent relational organizations and that no such organization supplies a final, self-explanatory foundation for reality. Its central question is how coherent worlds can exist without requiring permanent substances or an ultimate ground.

The answer has two parts. Within the world investigated by science, organization emerges through interactions, constraints, feedback, and historical development. At the level of ontology, RCO proposes recursive openness: the non-finality of attempts to identify a completely self-grounding basis of existence. These are related claims, but they are not interchangeable. A physical account of a living system does not prove a metaphysical thesis about all reality. Nor does a metaphysical commitment replace the work of explaining that system.

The argument draws on process philosophy, systems theory, emergence research, and cognitive science. It also develops more speculative interpretations of time, meaning, and meaningful coincidence. Throughout, three kinds of statement must remain

distinct: established properties of a model or observed system; interpretations of what those properties mean; and proposals that require further argument or testing. Their interaction can be fruitful only when one is not passed off as another.

The word coherence does considerable work here, but it does not mean that everything is harmonious. A coherent system has relations that sustain some identifiable organization. The organization may be fragile, harmful, locally effective, or resistant to change. A destructive institution can be coherent. A mistaken belief can fit an internally consistent story. Coherence becomes a desirable quality only when its particular consequences, openness to correction, and relation to human values are considered.

Recursion also needs a modest starting point. In physical and cognitive examples, it concerns processes whose results help shape subsequent activity: an action changes the conditions for the next action, a memory changes interpretation, or a constraint helps reproduce the organization that sustains it. In the ontological argument, recursive questioning refers instead to the renewed examination of an alleged foundation. The shared term identifies a family resemblance, not a demonstrated single mechanism spanning every domain.

The chapters move from the case for relational organization to the question of final ground, then examine emergence, persistence, time, consciousness, and meaning. Synchronicity is treated as a problem of interpretation and possible shared constraints, with clear conditions for empirical investigation. The final chapters consider ethics, mortality, science, and artificial intelligence. A glossary gathers the principal terms without requiring the reader to memorize them at the outset.

RCO does not ask the reader to deny the reality of objects, persons, or commitments. It asks what makes them real and how they continue. The answer defended here is that dependence and impermanence are compatible with reality. A temporary organization can act, matter, and deserve care. The absence of a final foundation need not remove the world; it may change how we understand our participation in it.

CHAPTER 1

From Objects to Relations

The practical reality of things

Ordinary life begins with things. A table supports a cup, a tree stands outside a window, and another person answers a question. These distinctions are indispensable. We cannot navigate the world by suspending every boundary or by describing each encounter as the total interaction of the universe. The usefulness of an object, however, does not settle the philosophical question of what ultimately makes it an object.

Substance metaphysics, in its many forms, gives enduring entities an important role in answering that question. Aristotle's account of substance and Descartes's distinction between thinking and extended substance are influential but different examples (Aristotle, 1998; Descartes, 1996). They should not be collapsed into a single doctrine. The tendency RCO challenges is more specific: explaining identity by appealing to an independently existing core whose relations and changes are secondary.

A relational approach begins elsewhere. It asks which interactions, dependencies, and patterns make a particular entity identifiable. A tree depends on cellular organization, water transport, soil, light, and a history of growth. Its boundary is useful and physically significant, but its continued existence is inseparable from exchanges across that boundary. An account that describes only a self-contained tree leaves out conditions that help constitute the living system.

This is not an argument that the tree is merely a concept. A tree can resist an observer's wishes and survive changes in how it is described. The claim is that its reality does not require absolute independence. Its organization is real, and its dependencies are part of the explanation of that organization. RCO therefore separates realism about entities from the stronger assumption that their identities must be grounded in isolated substances.

The difference can be expressed as a change in explanatory order. Instead of first positing complete things and then adding relations among them, we investigate the relational processes through which things become distinguishable and maintain themselves. Once established, those things can enter further relations. Relational priority does not erase individuals; it explains how individuality is achieved.

What the sciences contribute

Several scientific developments make this approach plausible, although none proves the whole ontology. Systems theory emphasizes that the organization of components matters to a system's behavior. Knowing the parts without their relations often leaves the most important explanatory question unanswered (von Bertalanffy, 1968). The same collection of components can support different functions under different arrangements and boundary conditions.

Physics also complicates the picture of self-contained objects with independently assigned properties. Quantum entanglement places limits on descriptions that treat composite systems as simple combinations of separately specified states. Quantum field theory offers accounts in which familiar particle descriptions arise within a richer field-theoretic framework. These developments motivate questions about ontology; they do not establish that every form of substance theory has been experimentally refuted. Kuhlmann's investigation of the ontology of quantum field theory illustrates the continuing philosophical work involved (Kuhlmann, 2010).

General relativity similarly transforms the relation between matter and spacetime geometry. It does not present geometry as an unaffected stage on which material objects happen to move. Yet moving from that insight to the claim that spacetime itself is emergent requires additional argument. Research in quantum gravity explores possibilities that challenge familiar assumptions, but RCO cannot treat an open research question as a completed scientific result (Rovelli, 2004).

The appropriate lesson is therefore measured. Scientific descriptions repeatedly make relations, organization, and context indispensable. This gives a relational ontology significant resources.

It does not license the conclusion that science has already selected one final metaphysics. RCO is an interpretation informed by scientific work and answerable to it, rather than a scientific discovery simply waiting to be named.

This distinction protects both philosophy and science. Philosophical inquiry can ask about the significance of a theory without pretending that its preferred interpretation is part of the theory's experimental confirmation. Science can constrain metaphysics without being burdened with claims it has not established. Where several ontological accounts fit the same evidence, their comparison must also consider clarity, explanatory scope, and unresolved difficulties.

Persistence without a fixed core

The whirlpool gives a concrete illustration of organizational identity. Water enters and leaves while a recognizable circulation persists. There is no additional whirlpool substance located behind the moving water. Nevertheless, the whirlpool is not an illusion. It has a shape, a history, and effects on objects that encounter it. Its dependence on a process is the way it exists.

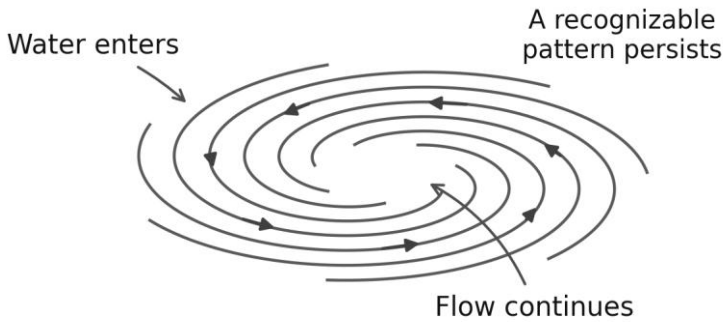

Figure 1. Persistence through flow. Water moves through the whirlpool while its recognizable organization continues.

A flame offers a related example. Its apparent stability depends on continuing exchanges and reactions. A melody offers a different one: its identity concerns ordered relations among events, not the persistence of a single sound. These examples are not equivalent in their mechanisms. Their common value is to show that identity and material sameness can come apart.

Organisms make the point more demanding. They maintain boundaries, regulate exchanges, repair damage, and coordinate activity across many scales. Their continuity cannot be reduced to having exactly the same constituents at every moment. Nor is it captured by a static diagram of their arrangement. A living organization must continue doing the work that makes its organization possible.

RCO calls this recursive stabilization when ongoing activity helps preserve the conditions for further organized activity. The term does not imply that every organism explicitly represents itself. A metabolic cycle and a reflective self-description are very different processes. Both can participate in maintaining an organization, but the distinction between biological regulation and cognitive modeling must remain visible.

The same caution applies to social examples. A university persists through procedures, buildings, records, people, and shared recognition. Its identity includes conventions in a way that a whirlpool's does not. A relational account becomes useful when it identifies these differences. It becomes empty if every entity is described as a vortex without any account of what actually sustains it.

Boundaries and levels of description

Relational dependence does not make boundaries arbitrary. A cell membrane is not merely a preference of the observer. It materially regulates exchange. At the same time, the relevant boundary can vary with the question. An explanation of cellular metabolism, an immune response, and an ecological interaction may require different units of analysis. A good ontology should make room for this plurality without treating every boundary as equally useful.

A system can be relatively autonomous while remaining dependent. Autonomy here means that its organization supports a degree of self-maintenance and a distinctive pattern of response. It does not mean freedom from all conditions. The autonomy of an organism is compatible with its need for food, water, and an environment within which its capacities can operate.

This view also clarifies relations between explanatory levels. Chemical descriptions illuminate an organism, but biological concepts may be needed to explain its regulation, development, and functional

organization. Social explanations may identify institutions and incentives that are difficult to express usefully as a catalogue of individual movements. Recognizing such explanatory value does not automatically establish additional fundamental forces.

The question is what each level contributes. If a higher-level description enables reliable prediction, identifies a stable pattern, or supports effective intervention, it can earn its place in explanation. RCO treats organization seriously for this reason. It does not require every useful higher-level category to be an independent substance, and it does not dismiss those categories because they depend on lower-level processes.

Process philosophy and the distinctive proposal

RCO belongs in conversation with traditions that give process and relation a central role. Whitehead's process philosophy is a major example, though the present framework does not adopt his entire metaphysical system (Whitehead, 1978). General systems theory and accounts of self-organization offer further resources. RCO should therefore be understood as a particular synthesis, not as the first recognition that reality involves becoming.

Its distinctive emphasis combines three commitments. Entities are understood through relational organization; their persistence depends on conditions rather than ultimate essence; and the search for a completely self-grounding foundation remains open. The third commitment extends beyond a general preference for dynamic descriptions. A philosophy could treat processes as fundamental substances of a new kind. RCO asks whether process itself is being used to end inquiry too quickly.

This makes the account vulnerable to an obvious objection. If everything is explained in terms of relations, what is related? In local explanations the answer is straightforward: cells, molecules, persons, institutions, or other identifiable organizations. Their relational constitution does not stop them from functioning as participants in further relations. An organism can be constituted through interactions and still interact with another organism.

The deeper issue concerns whether this explanation must eventually terminate in entities that are intrinsically complete. RCO proposes that it need not. That is an ontological position, not a result

established by the biological and physical examples alone. The next chapter develops the argument and asks whether rejecting final ground merely hides a new foundation under another name.

The reach and limit of the whirlpool

A metaphor is strongest when its limits are clear. The whirlpool exists in water under physical conditions. It cannot literally picture a condition prior to physical structure, because its own intelligibility already depends on structure. It therefore illustrates persistence within the world, not an explanation of why the world exists at all.

Likewise, calling the universe a whirlpool does not show that universes are made of a cosmic fluid, recur cyclically, or dissolve into a larger spatial container. Such claims would require independent evidence. The metaphor invites us to consider whether a world could be organizationally coherent without being metaphysically self-sufficient. It does not supply a cosmological mechanism.

For persons, the metaphor has a limited but valuable implication. A life can be continuous and consequential without containing an immutable inner object. Memories, relationships, embodied habits, and commitments can sustain an identity that develops. Whether this account fully explains consciousness or personal identity is a further question. It should not be answered simply by pointing again to moving water.

The argument established so far is modest enough to be defended and substantial enough to matter. Dependence does not imply unreality. Persistence does not by itself prove an unchanging substance. Organization deserves explanatory attention. These conclusions allow us to take a world of distinct things seriously while asking whether their distinction and continuity arise through processes more basic than their apparent separateness.

CHAPTER 2

No Final Ground

The demand for an ultimate explanation

Once objects are understood relationally, the question of foundations returns in a different form. What sustains the relations? What gives processes their possibilities and rules? An account can move from particles to fields, from fields to mathematics, or from matter to information while preserving the same ambition: identifying a final basis that needs no further explanation.

The ambition is understandable. Explanations often work by locating something more stable beneath an appearance. A broken device becomes intelligible when its mechanism is understood. A mechanism becomes intelligible through materials and physical laws. It is tempting to suppose that the same movement must eventually reach a final layer that explains everything else and explains itself.

Yet an effective local explanation is not necessarily an ultimate ground. Physical laws can explain a trajectory without settling why those laws obtain. A mathematical structure can organize a theory without settling why physical reality should instantiate it. An account may be highly successful within a domain and still leave its own presuppositions open to examination.

RCO takes this gap seriously. It proposes that reality is not finally secured by a self-explanatory object, law, mind, or formal totality. The expression no-ground ontology names that proposal. It does not mean that explanations are useless or that causes disappear. It means that the success of an explanation does not automatically confer ultimate metaphysical status on its starting points.

The proposal is stronger than the observation that humans currently lack a complete theory. Our ignorance might diminish, whereas RCO's thesis concerns the possibility of final closure itself. Because this is a stronger claim, it carries a greater argumentative burden. Repeatedly finding unanswered questions is a motivation for

no-ground ontology; it is not a deductive proof that no final answer could ever exist.

Why beginning with everything does not remove assumptions

Some approaches seek to avoid arbitrary foundations by beginning with a totality. If all possible worlds exist, perhaps no explanation is required for the selection of one. If all mathematical structures are real, perhaps existence follows from structural consistency. If reality is computation, perhaps complexity can arise from a minimal set of rules. These proposals differ substantially and deserve separate evaluation.

Lewis's modal realism, for example, is a developed theory of possible worlds and modality rather than a simple physical story about how our universe began (Lewis, 1986). Tegmark's mathematical universe hypothesis places mathematical structure at the center of a different ontological proposal (Tegmark, 2014). Computational approaches introduce still other commitments about states and operations. RCO's criticism should address their presuppositions without pretending that they make identical arguments.

The shared question is what a totality must already contain in order to be intelligible. An inventory of possibilities requires a criterion of possibility. A set of computations requires distinguishable states, rules, and a way of identifying an operation. A mathematical totality requires an account of structure and consistency. Saying everything exists does not remove these commitments; it moves them into the description of everything.

A defender can respond that these commitments are necessary, primitive, or justified by the explanatory power of the resulting theory. That response is not automatically incoherent. RCO's objection is that the appeal to totality alone does not make the commitments disappear. An ontology should disclose what it assumes rather than treating maximal scope as freedom from assumptions.

The issue is not simply how many entities a theory includes. A large ontology can be theoretically economical if it follows from a compact and productive principle. Conversely, a theory that uses a

single word for its foundation may conceal considerable structure. The relevant comparison concerns explanatory work, intelligibility, and the status of the principles themselves, not just an informal count of things.

Possibility as emerging organization

RCO proposes that possibility need not be conceived as a completed catalogue waiting for actuality to choose from it. Within physical and human systems, what is possible often changes when organization changes. A new skill enables actions that were not previously available to a person. A new institution permits forms of coordination that did not previously exist. New combinations can alter the space of further combinations.

There are two claims here. The weaker claim concerns accessible possibilities within a specified system. These clearly depend on conditions, capacities, and organization. The stronger claim concerns ontological possibility itself: whether the complete space of what could exist is already fixed independently of all emergence. RCO favors an open interpretation, but examples of changing practical possibility do not establish that stronger thesis on their own.

Keeping the claims distinct prevents a verbal shortcut. A physicist can model an evolving system within a fixed state space even while its accessible region changes. A biologist may need to revise a description as new functions arise. These differences concern models and their domains. An argument that all possibility is ontologically emergent must do more than point to limitations in our descriptions.

The philosophical attraction of the stronger proposal is that it avoids treating novelty as merely the selection of a fully articulated preexisting item. It allows emergence to concern the formation of distinctions and capacities through which future alternatives become meaningful. Its difficulty is explaining such formation without already relying on some notion of possibility. RCO recognizes this as a central problem rather than hiding it behind the phrase recursive openness.

The framework therefore uses open possibility as a commitment to non-finality, not as a claim to describe an inaccessible warehouse of unborn worlds. It does not identify a prephysical reservoir. It questions the assumption that a complete reservoir must exist. The

negative and critical role of the concept is clearer than any claim to have modeled the origin of all structure.

Recursive openness and renewed questioning

Ontological recursive openness names the non-finality proposed by no-ground ontology. When a foundation is offered, its distinctions, relations, and explanatory status can be questioned in turn. The inquiry reopens at what appeared to be an endpoint. This is the sense in which it is recursive: the demand for grounding returns to the proposed ground.

The image of point-within-point recursion expresses this movement. A supposed final point of explanation does not remain a simple endpoint under examination. It opens into questions about what makes it identifiable and what role it plays. The image is conceptual. It does not assert that physical space contains infinitely nested universes or that every particle literally conceals another world.

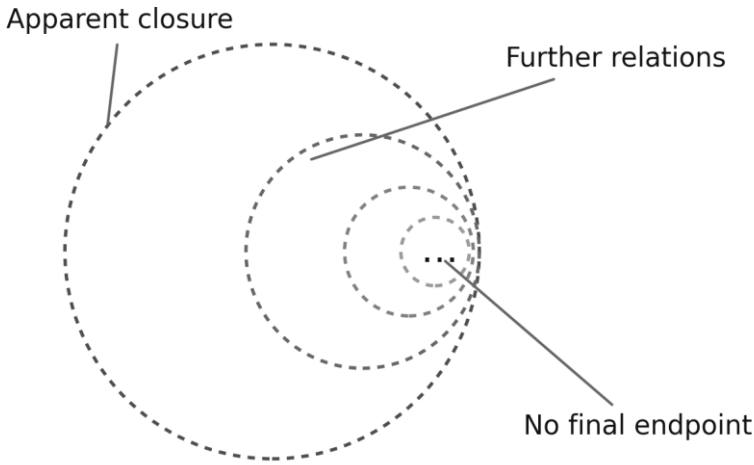

Figure 2. Point-within-point recursion. Each apparent endpoint reopens into further relations; the nesting represents ontological non-finality, not physical shells or smaller universes.

No-ground also differs from absolute nothingness. Rejecting a final substrate does not require rejecting the existence of organized reality. A landscape of dependent explanations is not the same as an

empty void. The book therefore uses no-ground to mean absence of an ultimate self-grounding foundation, not absence of everything that exists.

The vocabulary of depth must nevertheless be handled carefully. Calling openness the deepest layer suggests that it is one more thing beneath other things. Calling it a source can suggest a productive agency. Calling it a field can imply spatial and mathematical structure. These expressions may be evocative, but taken literally they would reintroduce the kind of foundation the argument questions.

The most disciplined formulation is consequently this: recursive openness is a claim about the non-finality of grounding, not the name of a hidden entity. It does not possess intentions, transmit messages, or store personal identities. References to pre-structural openness indicate that the thesis is not defined as a particular physical structure. They do not provide a positive scientific description of a state before the universe.

Two uses of openness

The framework distinguishes ontological recursive openness from physical recursive openness. The former concerns the absence of final metaphysical closure. The latter concerns processes within identifiable physical systems: changing configurations, feedback, constraint, emergence, and dissolution. These concepts operate at different explanatory levels.

Physical openness can be investigated by specifying a system, its exchanges, and the relevant dynamics. A biological system may be thermodynamically open. A dynamical model may have several accessible trajectories. A cognitive system may remain responsive to new information. These are not all the same kind of openness, and the broad RCO expression must not erase their technical differences.

Ontological openness cannot be measured in the same way. It does not have a temperature, a boundary through which energy flows, or a probability distribution. Empirical findings can affect the plausibility of its associated interpretations, but they do not directly register the presence of no-ground as a physical variable. This is why entropy cannot simply be equated with recursive openness.

The relation between the two is philosophical. RCO interprets physical processes as compatible with, and illustrative of, a reality

without final closure. It does not derive thermodynamics from a metaphysical principle. Nor does it infer no-ground from the second law. The distinction allows the framework to use scientific explanations without presenting them as proof of its entire ontology.

This is also not a division into two substances. There is no physical world on one side and a second, immaterial substance called openness on the other. The two terms mark a difference between describing processes and interpreting the status of grounding. RCO's claim would become confused if it treated them as interacting realms while denying the need to explain their interaction.

Does no-ground become a new ground

The strongest objection is that the framework declares non-finality to be final. If RCO knows that no ultimate ground exists, has it not established an ultimate truth? If openness explains everything, is it not simply the new absolute? These questions expose a real tension that no amount of anti-mystical language can resolve by itself.

One response distinguishes a universal thesis from a foundational entity. A claim about the limits of grounding need not introduce a substance that causes the world. Yet that response leaves the epistemic question intact: what warrants the universal claim? RCO must defend its preference for non-finality through argument, comparison, and willingness to confront alternatives. It cannot exempt itself from the openness it recommends.

Accordingly, this book presents no-ground as a philosophical position rather than an unassailable conclusion. Its strength lies in avoiding arbitrary explanatory stopping points and drawing attention to the dependencies concealed by apparently self-contained foundations. Its vulnerability is that the availability of further questions does not always invalidate a proposed stopping point. Some questions may be ill-posed, and some explanations may reasonably end with primitives.

A competing foundational account could therefore challenge RCO by giving a coherent defense of its primitives and showing that non-finality adds no explanatory value. RCO would need to answer that challenge directly. Merely repeating that every ground opens again would restate the thesis at issue. The credibility of the framework depends partly on refusing this circular defense.

What the proposal changes

Accepting no-ground does not oblige a person to abandon working commitments. We can use well-supported theories, recognize stable objects, and make decisions under conditions of incomplete justification. Local reliability is not the same as ultimate certainty. The rejection of final closure should make explanation more careful, not prevent explanation altogether.

It also changes the role of information. Information is indispensable in many descriptions, but RCO does not treat it as an eternally self-subsisting code. Informational patterns require some account of distinctions, relations, and realization. A record, a signal, and a meaning are related but different cases. None becomes an ultimate substance simply because information is a powerful explanatory vocabulary.

The next step is therefore constructive. If entities are organized processes and no final substance is assumed, how does stable organization arise? That question can be pursued through models and examples without first solving every problem of ultimate origin. The ontological inquiry establishes the scope of the proposal. The study of emergence begins the work of explaining the coherent structures we actually encounter.

CHAPTER 3

Emergence and Recursive Geometry

What emerges

A collection of water molecules can form liquid water, ice, or vapor under different conditions. The distinction concerns organization and collective behavior, not the arrival of a new substance concealed inside the molecules. Rigidity belongs to an organized state. It is not a property that must be possessed by each isolated component in order for the whole to exhibit it.

This familiar example helps separate emergence from mystery. An emergent property can be new at a level of description without appearing outside physical explanation. The relevant task is to identify the interactions, conditions, and organization that make the property possible. Naming emergence is the beginning of this task, not its completion.

RCO favors accounts in which higher-level organization arises through lower-level interactions and constraints. It therefore aligns with a broadly weak-emergent approach. Bedau's influential technical account connects weak emergence to macro-properties derivable from a system's micro-dynamics through simulation (Bedau, 1997). The broader use in this book should not be mistaken for a claim that every example satisfies the same formal definition.

Strong emergence, in one common sense, proposes fundamentally novel causal powers that are not fully accounted for by the lower-level organization. RCO does not need to invoke such powers to explain a whirlpool, a flocking pattern, or a crystal. Whether an analogous organizational account fully explains subjective experience is more contested. The success of simple examples cannot settle the consciousness debate in advance.

There are therefore two mistakes to avoid. One is to treat an unfamiliar collective property as evidence of a supernatural addition. The other is to assume that describing the components renders the higher-level organization explanatorily redundant. A bridge and a pile of materials can differ in what they do even when their material inventory is similar. Organization supplies part of the difference that an adequate explanation must capture.

Local interaction and collective form

Flocking gives a useful model of how collective organization can arise without a central director. Reynolds's simulation generated coordinated aggregate movement from local behavioral rules governing separation, alignment, and cohesion (Reynolds, 1987). The important result is not that every biological flock follows one simple program. It is that recognizable global order can be produced by distributed interaction.

A person watching the resulting pattern may be tempted to imagine an intention belonging to the flock as a whole. The model shows why this is not always necessary. Rules at the level of individual agents can generate a higher-level pattern that is neither explicitly represented nor centrally commanded. A relational explanation identifies the conditions under which the pattern develops and the perturbations under which it changes.

Self-organization does not mean organization without conditions. A simulation depends on its rules and implementation. A natural system depends on material properties, energy flows, and environmental circumstances. Removing a central designer from the explanation does not remove these requirements. RCO uses self-organization to shift attention toward distributed processes, not to turn emergence into an unexplained creative power.

This point matters when moving across domains. A crystal, an organism, and an institution do not self-organize in identical ways. A crystal may be explained through physical interactions and boundary conditions; an institution also involves learning, interpretation, and rules that participants recognize. The claim that both involve organization is a starting comparison. It becomes explanatory only when the mechanisms and relevant differences are specified.

Constraint as a condition of possibility

Constraint often sounds like a reduction of freedom. In an organized system it can also create a capacity. A channel limits where water flows while enabling directed flow. A membrane limits exchange while helping maintain a cell. A grammar excludes many sequences while allowing a language to support reliable distinctions. The alternatives removed and the capacities enabled must be considered together.

A constraint is not necessarily an external command. It may be a relation among components, a boundary condition, a structural arrangement, or an inherited feature of a system. It shapes which transitions are accessible and how likely they are under specified conditions. This is more precise than saying that constraint creates order in every case. Some constraints prevent useful organization, while others sustain it.

RCO describes emergence as relational stabilization when interactions produce an identifiable organization that can persist or recur. Persistence need not mean perfect stillness. A pattern can remain recognizable while its components and internal states change. What matters is which relations continue to be maintained and how they influence the system's behavior.

A higher-level organization can also constrain lower-level activity. An organism's regulatory organization shapes conditions within its cells. An institution's procedures shape what participants can do. Such descriptions need not imply forces that violate lower-level physics. They identify organized conditions through which ordinary interactions occur. The resulting explanation must still show how the constraint is realized, rather than treating the whole as a separate invisible agent.

Pascal recursion as an exact model

Pascal's triangle provides a compact example of how a simple recursive rule generates structured multiplicity. Each interior entry is the sum of the two entries above it. The boundary entries are one. With the first row indexed by zero, the entry in position k of row n is the binomial coefficient counting ways to choose k items from n. Writing this count as C(n, k), the recurrence is:

$$C(n,k) = C(n-1,k-1) + C(n-1,k)$$

The triangle can also represent a simple branching process. After n binary choices there are 2 to the power n distinct ordered histories. Histories with the same number of choices of one kind are grouped by a binomial coefficient. Different paths can therefore arrive at the same coarse description. The final count need not uniquely specify the history that produced it.

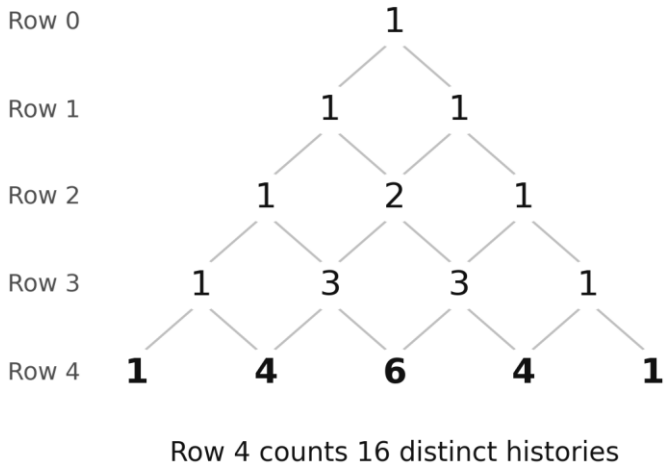

Figure 3. Pascal recursion through row four. The entries count grouped binary histories. Probabilities require additional assumptions; the diagram alone is not a model of physical stability.

In the illustrated fourth row, the coefficients are 1, 4, 6, 4, and 1. The central count has the largest multiplicity: six of the sixteen ordered histories contain two choices of each kind. If the binary choices are independent and equally likely, dividing the coefficients by sixteen gives the probabilities of those grouped outcomes. Without those assumptions, the counts alone do not supply a probability model.

This distinction corrects an easy visual misunderstanding. The outer entries are not regions of maximal combinatorial multiplicity. Each edge entry counts only one history of the relevant kind. The row expands geometrically, but the largest coefficient lies near its center. One can use the widening shape to evoke expanding alternatives,

provided the metaphor is not confused with what the coefficients actually measure.

A second limit is equally important. Pascal's triangle does not by itself contain attractors, energy barriers, feedback regulation, or a physical mechanism of stabilization. Its central coefficients are large because many histories share a count, not because that count is automatically a stable physical state. To interpret a region as an attractor, a model must specify dynamics under which trajectories are drawn toward it.

The model nevertheless contributes something useful. It separates a history from a grouped outcome, shows how multiplicity accumulates through local recursion, and demonstrates that simple rules can generate structured global patterns. These are genuine mathematical properties. They can guide questions about emergence without being elevated into a universal law of physical organization.

Fibonacci structure within the triangle

The Fibonacci sequence supplies a related illustration. Beginning with zero and one, each subsequent term is the sum of the preceding two. Certain shallow diagonal sums of Pascal's triangle generate Fibonacci numbers. This is an exact relationship between two recursive constructions, not evidence that one sequence acts as a hidden force.

$$F_n = F_{n-1} + F_{n-2} \quad (n \geq 2)$$

The philosophical interest is that recognizable order can arise within a larger combinatorial structure. A pattern need not be inserted afterward by an external organizer. Yet the existence of the pattern does not establish the stability of a biological or physical system. Stability is a property of specified dynamics and responses to disturbance. A numerical recurrence alone does not provide that information.

For this reason, the expression Fibonacci stabilization is used only as a heuristic: a way of directing attention toward accumulated relations and recurrent structure. When a system exhibits a Fibonacci-like pattern, the explanatory question is which growth processes and constraints produce it. The answer cannot be supplied

by the recurrence's name. Nor should approximate resemblance be counted as confirmation without a defined measurement.

A useful research model would specify the variable expected to follow the recurrence, the range over which the relation should hold, and how deviations are evaluated. It would compare alternatives rather than looking only for favorable examples. A sequence that seems visually suggestive may lose its special status once ordinary growth models and measurement uncertainty are considered.

These requirements preserve the original ambition of recursive geometry while narrowing its claim. Mathematics provides precise tools for investigating organization. It does not remove the need to connect a tool to a particular system. The strength of an application lies in that connection, not in the familiarity or elegance of the sequence.

Symmetry does not guarantee stability

Symmetry is another feature that invites interpretation. Pascal's triangle is symmetric because choosing k items from n has the same count as choosing the n minus k items left behind. The symmetry follows from the counting problem. It is not a general proof that balanced arrangements persist or that asymmetry signals failure.

In physical models, symmetry can constrain possible behavior, and breaking a symmetry can accompany the formation of structure. In other settings, a symmetric state may be unstable. The relation between symmetry and stability depends on the governing dynamics. RCO therefore treats symmetry as a potentially relevant organizational feature rather than a universal measure of coherence.

The same applies to images of a system balanced between chaos and rigidity. Such images can be helpful, but their terms must be defined in each application. A stable crystal, a changing ecosystem, and a flexible institution do not occupy one measurable middle point on a single universal axis. Some systems benefit from tightly maintained conditions; others require a wide range of possible responses.

The broad insight is that persistence and change can coexist. Its scientific expression requires a model of how they coexist. A picture can introduce the question, while a formal or empirical investigation determines whether the proposed relationship holds. Keeping those

roles distinct prevents the geometry from carrying a burden it cannot support.

Emergence without a final blueprint

Recursive models show how organization can develop under rules and constraints. They do not explain why there are rules or why anything exists. Even the simplest triangle presupposes distinguishable entries, an operation, and an indexing scheme. It therefore cannot literally model a condition in which all distinction and structure are absent.

This is the practical consequence of the distinction introduced in Chapter 2. Pascal and Fibonacci constructions belong to structured modeling. They can illuminate aspects of physical recursive openness, but they do not depict ontological openness itself. Treating them as an eternal blueprint would reverse the no-ground argument by installing mathematics as an unquestioned final substance.

RCO instead assigns mathematics a disciplined role. Models identify relations, permit deductions, and sometimes generate predictions that can be tested. Their success can reveal structure that unaided intuition misses. Their scope must still be stated. A model of branching is not automatically a model of consciousness, and a recurring pattern is not automatically a universal cause.

These models show how interactions can generate real, coherent patterns without an extra essence. Explaining emergence still leaves persistence to be explained: which conditions sustain an organization, and what makes it vulnerable to change?

CHAPTER 4

How Coherence Persists

Stability as an achievement

The emergence of a pattern does not explain how long it will last. A brief alignment may disappear almost immediately, whereas another organization can persist despite continuous disturbance. To understand the difference, we must examine the conditions that maintain the pattern, the feedback through which it responds, and the limits of those responses.

RCO places metastability at the center of this inquiry. In a technical physical context, a metastable state can persist for a substantial time without being the system's most stable available state. In broader discussions of cognition and society, the word is often used more loosely for relatively durable but revisable organization. This book uses that broader sense where appropriate and does not assume that every social example has a literal energy landscape.

The important contrast is between persistence that depends on conditions and permanence that requires none. A system can be reliable without being invulnerable. Its stability may depend on continuing exchange, regulatory capacity, environmental regularity, or a barrier that makes alternative configurations difficult to reach. Different forms of persistence require different explanations.

A living organism and a crystal illustrate the distinction. An organism relies on extensive ongoing regulation and energy throughput. A crystal can remain in a stable arrangement through different physical conditions and mechanisms. Both are organized, but it would be misleading to treat their maintenance as one undifferentiated process. RCO's vocabulary should connect cases without suppressing their differences.

Attractors and landscapes

Dynamical systems theory provides precise ways to study recurrent behavior. Under appropriate definitions, an attractor is a set toward which nearby trajectories tend as the system evolves. It may be a fixed point, a repeating orbit, or a more complicated set. Attractors concern a specified model and its dynamics, not a hidden purpose that draws the system toward a preferred destiny (Strogatz, 2015).

A landscape picture can make some forms of stability intuitive. A ball in a basin tends to remain near the bottom unless disturbed enough to cross a barrier. A deeper basin or a larger barrier may correspond to greater persistence in a suitable model. Real systems can be much more complicated: the landscape may change, the dynamics may not derive from a potential, and noise may matter.

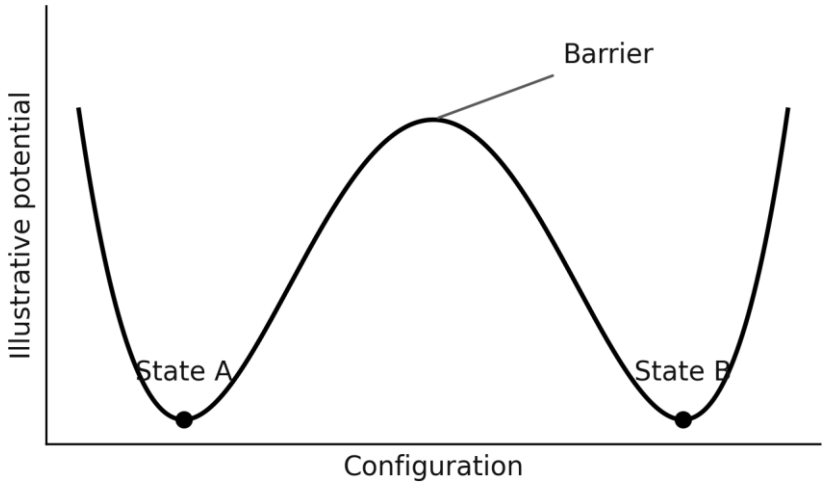

Figure 4. An illustrative landscape with two local minima. Persistence depends on the specified dynamics, disturbances, and barriers. This diagram is conceptual and has no empirical units.

The diagram is therefore an illustration of a possible organization of alternatives, not a universal map of reality. In a physical application, the horizontal and vertical quantities would need definitions. In a psychological application, one must be especially careful not to mistake a suggestive picture for a measurement. Calling a habit an attractor can help frame a question, but it does not by itself establish a dynamical model of that habit.

What the image captures is the dependence of persistence on more than an instantaneous state. The relation between a current state, nearby alternatives, and available transitions matters. A small change may be absorbed in one regime and amplified in another. Understanding stability therefore means studying a system's possible responses, not merely photographing its current organization.

Feedback and recursive maintenance

Feedback occurs when the consequences of a process return to influence its subsequent activity. Negative feedback tends to counter a deviation relative to a reference or operating condition. Positive feedback tends to amplify a change. Neither label means morally good or bad. Their effects depend on the system, the strength of the response, the timing, and the context.

A regulatory loop can help maintain a variable within a range. If the response arrives too late or overshoots, the same loop can produce oscillation or instability. An amplifying loop can support growth, learning, or rapid transition, but it can also produce runaway behavior. The presence of feedback is therefore not enough to establish adaptive organization.

Recursive stabilization occurs when such interactions help maintain the conditions for the organization's continuation. A practice is repeated because its consequences reinforce the conditions that sustain it. An institution trains participants who reproduce its procedures. A biological system uses products of its activity to support further activity. Each case needs its own causal account, but the general form directs attention to self-maintaining relations.

This does not mean that a system consciously chooses to preserve itself. A thermostat, an organism, and a self-reflective person involve different capacities. Using a common language of feedback can reveal similarities while encouraging false analogies. RCO treats conscious self-maintenance as one specialized case, not the template from which all persistence must be understood.

Accumulated constraints

Organization also persists because past activity changes the conditions of future activity. A path becomes easier to follow through repeated use. A skill changes what a person can notice and do. An infrastructure makes some forms of coordination inexpensive and others difficult. The present contains effects of the route by which it was reached.

RCO calls this constraint accumulation when earlier organization modifies later possibilities. The phrase includes physical changes, learned dispositions, and institutional arrangements, but those examples should not be conflated. A legal rule constrains partly through shared recognition and enforcement. A material barrier constrains through physical interaction. Their common relevance is that history alters the range and cost of subsequent action.

Accumulation can support competence. A musician no longer has to reconstruct every elementary movement, and a community does not have to renegotiate every shared convention from nothing. Stable organization makes complex activity possible. The same inheritance can also restrict adaptation when circumstances change. A once-effective procedure can become an obstacle if it is preserved without regard to its current consequences.

A system can therefore become good at maintaining itself while becoming less well suited to its environment. Persistence and success are not synonyms. An institution may survive by shifting costs to others. A habit may be strongly reinforced while harming the person who maintains it. The framework must ask what is stabilized, at whose expense, and under which conditions.

Thresholds and reorganization

Some changes are gradual; others involve a transition into a different regime. A threshold is useful language when a small additional change can produce a substantially different response. The concept must be grounded in a particular model or observation. Not every difficult period is a phase transition, and not every sudden change indicates a universal developmental sequence.

The sequence threshold, reorganization, and integration describes one possible pattern. An existing organization becomes difficult to

maintain. Relations change, alternatives are explored or forced, and a new organization may eventually stabilize. This can occur in systems with very different mechanisms, so the sequence is a descriptive guide rather than a law that guarantees the outcome.

Integration is especially easy to overstate. A system may reorganize without becoming more complex, more adaptive, or better for its participants. It may fragment or settle into a harmful pattern. A crisis can open possibilities while also causing irreversible losses. RCO's commitment to openness does not justify celebrating every breakdown as hidden progress.

The practical question is what makes constructive reorganization more likely. Resources, redundancy, feedback, environmental conditions, and opportunities for correction can all matter. Their relevance must be investigated rather than deduced from the word transformation. A general ontology can suggest where to look; it cannot decide the outcome in advance.

Flexible coherence

Flexible coherence names an organization that maintains enough continuity to act while retaining a capacity to respond to relevant change. It is useful for thinking about living, cognitive, and social systems, but it is not a single numerical property. The appropriate balance depends on the system's tasks, vulnerabilities, and environment.

A reliable commitment may need resistance to momentary distraction. A scientific belief may need readiness to change when evidence changes. A safety procedure may need strict execution in ordinary conditions and a clearly governed route for revision. Flexibility does not mean constant alteration, and coherence does not mean refusing alteration. What matters is whether the organization can distinguish noise from information that should change its response.

This provides a more specific alternative to simply praising openness. A system open to every perturbation can lose the continuity required for meaningful action. A system closed to every correction can persist in failure. Adaptive organization requires selective responsiveness: retaining some constraints, revising others, and having workable ways to evaluate the difference.

RCO consequently treats persistence as an ongoing relation between organization and conditions. The same pattern may be resilient in one environment and brittle in another. Its identity is not independent of the history and context through which it continues. That observation leads directly to time: persistence is not only a present arrangement, but a history of maintained and transformed relations.

CHAPTER 5

Time Entropy and History

The direction of change

A broken cup does not ordinarily reassemble itself. A memory can influence tomorrow's decisions but cannot be used yesterday. An organism develops through a history that leaves traces in its present organization. These familiar asymmetries motivate RCO's interpretation of time as inseparable from transformation, accumulated constraint, and the formation of records.

The interpretation should be stated carefully. Physical theories use temporal quantities with precise roles, and explaining why some processes have a direction is not the same as deriving time itself. A thermodynamic arrow, the ordering of events, the duration measured by a clock, and the experience of passage are related questions, not one question with interchangeable answers.

Newton's absolute time and the spacetime of relativity also should not be treated as versions of a single unchanged picture. Relativity altered the relation between temporal measurements, motion, and gravitation (Newton, 1999; Einstein, 2001). RCO's objection is directed at treating time as an independently flowing substance. It does not invalidate the mathematical use of temporal coordinates or replace the successful predictions of existing physics.

The positive proposal is that temporal intelligibility depends on relations among processes. We identify duration by comparing change, and we identify history through organized traces. RCO gives particular attention to irreversible and path-dependent transformation because these help explain why a world contains a distinguishable past and an open field of future action. This remains a philosophical interpretation, not a completed physical derivation of spacetime.

Entropy with its physical meaning intact

Entropy has a technical role that should not be replaced by a general synonym for disorder, possibility, or decay. In a statistical description, it concerns the distribution or multiplicity of microscopic states compatible with a macroscopic description, under specified assumptions. The physical definition, the chosen description, and the relevant constraints all matter.

The second law concerns the entropy of an isolated system, with the appropriate statistical qualifications. It does not state that every subsystem must become less organized at every moment. A subsystem can maintain or increase local organization while exchanging energy and matter with its surroundings. The entropy accounting must include the relevant wider process. Work on nonequilibrium organization illustrates why local order and entropy production are not simple opposites (Prigogine and Stengers, 1984).

RCO's language of reopening possibility is an interpretation of some changes in accessible configurations. It is not a replacement definition of entropy. An increase in entropy does not necessarily enlarge the underlying phase space of a model, create new kinds of physical possibility, or improve a system's capacity to do useful work. These claims require separate arguments.

This distinction becomes especially clear near equilibrium. A state can have high entropy while offering fewer exploitable energy gradients for maintaining complex organization. More microscopic multiplicity does not automatically mean more biological creativity or more practical freedom. A metaphor that associates entropy only with generative openness would therefore miss an important physical limitation.

The useful insight is narrower. Physical transformations can redistribute energy, alter constraints, and change which configurations are accessible or likely. Some of these processes permit new organization; others destroy the conditions required for it. Entropy participates in a physical account of these changes, but it does not supply a general principle that all dissolution produces renewal.

Historical constraint

Path dependence means that the route to a present condition can matter for what happens next. A simple record of current large-scale variables may leave out features acquired through the system's history. Two organizations that look similar under one description can therefore respond differently because their internal arrangements, resources, or learned dispositions differ.

This does not mean that history acts as an additional force detached from the present. Its effects must be carried by present conditions: material structure, memory, institutions, or other forms of organization. A sufficiently rich state description may incorporate what a simpler account calls historical dependence. RCO's emphasis is that explanations often need to identify how history is embodied, rather than treating it as irrelevant background.

An organism develops within inherited and acquired constraints. A language user inherits distinctions that shape what can readily be expressed. A city develops around roads, buildings, and policies that make some later choices easier than others. In each case, the past matters through the organization it has helped produce. The type of inheritance differs, but the explanatory question has a common form.

Constraint accumulation can both narrow and expand future possibilities. Learning a musical instrument limits some movements through trained coordination while enabling performances that were previously impossible. Building an infrastructure commits resources and establishes dependencies while opening new forms of exchange. The relation between constraint and possibility is therefore more complicated than a simple trade-off between order and freedom.

Recursive asymmetry

Recursive asymmetry is RCO's term for transformation whose effects alter subsequent conditions in ways that are not simply erased by reversing a superficial action. An apology does not undo the fact that a conflict occurred. Rebuilding a structure does not remove the history of its destruction. At the relevant level of description, the system carries consequences forward.

The concept includes different kinds of asymmetry that should remain distinguishable. Physical irreversibility, information lost

under coarse description, and the practical difficulty of reversing a social process are not identical. A mathematically reversible microscopic model can still support effectively irreversible macroscopic behavior under suitable conditions. RCO should not infer a single fundamental law from a family of everyday examples.

The proposed connection to time is that accumulated differences help constitute the history by which a system is oriented. Records distinguish what has happened from what is only anticipated. Present organization bears traces of earlier events and constrains later ones. Time, in this interpretation, is inseparable from the relations that make ordering, duration, and historical consequence possible.

There is a circularity risk. If recursion is described as one state following another, temporal order has already entered the description. It would be circular to announce that time has then been derived from succession alone. A fully developed theory of emergent time would need to specify a more basic structure and explain how temporal relations arise from it. This book offers an organizing interpretation of temporal asymmetry, not that completed theory.

Memory without anthropomorphism

The word memory can identify several ways in which past events affect present response. Psychological recollection is one case. A material trace, an acquired immune response, and an institutional record are other cases with different mechanisms. Calling them all memory is useful only if it does not imply that each involves experience or conscious recall.

A footprint contains a trace of an interaction without remembering in the personal sense. An archive can preserve a record without interpreting it. A person can remember an event by reconstructing it through current cognitive activity. RCO brings these cases together as examples of history retained through organization while keeping their differences in representation and experience explicit.

Memory also depends on maintenance. A trace can erode, a record can be lost, and a recollection can change. The past is not preserved as a complete duplicate inside the present. Particular relations retain particular aspects of earlier organization, with different degrees of reliability and accessibility. A relational account therefore asks what is preserved, by which mechanism, and for what use.

Personal identity relies on more than explicit autobiography. Bodily habits, emotional dispositions, interpersonal recognition, and continuing commitments can contribute to a person's continuity. A person need not recollect every event in order to remain the same individual in ordinary or ethical contexts. Equating identity entirely with narrative memory would make the framework unnecessarily narrow.

Openness and prediction

If history constrains the future, does the future remain open? The answer depends on the meaning of openness. Limited predictability can arise from incomplete information, sensitivity to initial conditions, or computational difficulty. It does not by itself prove ontological indeterminism. A deterministic model can be difficult to predict, and a probabilistic model can produce highly reliable aggregate expectations.

RCO's ontological openness should therefore not be used to settle every question about determinism. Its central claim concerns final grounding. Whether a particular physical process is deterministic requires an appropriate theory and evidence. The framework can recognize constrained alternatives without claiming that no event is ever fixed by antecedent conditions.

For practical agents, openness concerns the alternatives available through their capacities and circumstances. Deliberation can matter because it is part of the process through which an outcome is produced. The fact that deliberation has causes does not render it causally irrelevant. A relational account of agency examines how reasons, habits, environments, and feedback shape action rather than demanding an agent outside all causation.

Prediction also changes some of the systems it enters. A forecast can alter behavior, and altered behavior can change the conditions that supported the forecast. This is especially relevant to social and cognitive systems. It is one reason recursive modeling must attend to its own participation in the world rather than imagining every model as a detached mirror.

Dissolution and cosmological limits

The possibility of a far future with greatly reduced usable energy gradients gives a large-scale illustration of the dependence of complex organization on conditions. The exact future of the universe remains a scientific question. RCO does not establish a particular cosmological scenario, a cycle of new universes, or a mechanism by which complexity must return after its disappearance.

Within the framework, the dissolution of a physical organization does not answer every question of ultimate grounding. But this philosophical point supplies no energy, process, or promise of renewal. Ontological non-finality must not be treated as a physical resource that restarts a universe. Doing so would convert an interpretive thesis into an unexplained causal agent.

The distinction matters equally at smaller scales. The disappearance of a pattern can be final for that pattern even if reality as a whole is not given a final metaphysical explanation. A burned archive may be irretrievable. A lost relationship cannot always be restored. Openness is compatible with irreversible loss, and a serious relational ontology must make room for both.

The account of time therefore has a restrained conclusion. Organizations persist through histories that help shape their possibilities. Entropy, constraints, records, and feedback contribute to particular forms of direction and change. RCO interprets this as recursive becoming, while leaving the physical foundations of temporality open to further investigation. History is not an optional addition to coherent reality; it is part of what makes an organization the organization it is.

CHAPTER 6

Consciousness Selfhood and Flexibility

The reality of experience

A theory of organization must eventually confront a difficulty that a whirlpool does not resolve. Experience has a first-person character. There is something it is like to hear music, feel pain, recognize a face, or wonder about oneself. Describing coordinated activity may identify conditions associated with experience without yet explaining why those conditions have an experiential aspect.

RCO proposes that consciousness depends on particular forms of organized physical activity. It rejects the need to posit a permanent observer-substance behind that activity. Yet it does not claim that the phrase recursive stabilization solves the relation between physical organization and subjective experience. The proposal is a direction for explanation, not a finished theory of consciousness.

This distinction protects the reality of experience. Explaining a phenomenon through conditions does not make it unreal. A pain can be physically dependent and still matter profoundly to the person who feels it. RCO opposes the inference that organizational dependence reduces experience to a dispensable illusion. It also opposes the inference that experience must therefore be a fundamental cosmic substance.

The positive question is which kinds of integration, differentiation, embodiment, and recurrent interaction support consciousness, and how they do so. Different theories answer that question differently. The broad framework developed here does not decide between them without evidence. Its contribution is to understand consciousness as a maintained organization with conditions and limits, rather than an immutable thing merely housed in a body.

Modeling without an inner spectator

Cognitive systems can organize information about their bodies, environments, and ongoing activities. Some of this organization helps support perception, action, and self-understanding. Predictive approaches emphasize the interaction between expectations and incoming information, though their details and scope remain debated (Clark, 2016; Friston, 2010). RCO draws on this family of ideas without identifying all cognition with one formal theory.

A model in this context need not be a picture inspected by someone inside the head. It can be a structured set of dispositions and processes that shapes response. Adding an inner spectator would simply reproduce the original problem: how does that spectator perceive, interpret, and act? An organizational account seeks to explain the capacities through the interacting processes themselves.

Self-modeling is a specialized case. A system may organize distinctions between its own activity and external events, anticipate consequences for itself, or represent aspects of its body and history. Human selfhood includes explicit reflection, but it also includes less articulated forms of embodied orientation. A person's experience of being situated is not exhausted by a spoken story about who they are.

Recurrence and self-reference are not sufficient conditions for consciousness. A simple feedback device can return information about its state without having demonstrated experience. The term recursive must therefore identify relevant organization rather than operate as a substitute for explanation. A credible theory would need to specify what distinguishes conscious organization from the many recurrent processes that are not known to be conscious.

Attention and organized access

Attention influences which information guides perception, thought, and action. It can amplify some distinctions while leaving others less available for explicit use. Within RCO, this is one way constraints shape the organization of experience. Attention selects and sustains relations within a much wider field of ongoing activity.

It would nevertheless be too strong to identify attention with consciousness itself. A complete account must allow for their different roles and for debates about how they interact. The present

framework treats attention as an important contributor to organized access and salience, not as a proven universal switch that creates experience whenever it is turned on.

The practical effect of attention is easier to see. Repeatedly attending to a concern can increase its prominence in a person's day. Attention can bring a previously unnoticed pattern into view, but it can also narrow the range of evidence considered. What appears central may partly reflect how a cognitive system has learned to allocate its resources.

This provides a link between cognition and meaning. An event does not arrive in experience carrying a complete, context-free significance. Its importance depends partly on the person's aims, history, bodily condition, and relationships. Attentional organization helps determine which relations become salient. The next chapter develops this point without treating all interpretation as arbitrary projection.

Implicit activity and changing states

Much of the activity supporting perception and action is not available as explicit reflection. Calling it subconscious does not require imagining a second person hidden beneath the first. It refers broadly to processes that affect behavior and experience without becoming objects of ordinary conscious access. The specific mechanisms need to be identified rather than assigned to a single mysterious inner agent.

Sleep illustrates why conscious organization should be studied as variable rather than assumed to remain unchanged. However, non-REM sleep cannot simply be equated with complete absence of experience. Research has found reports of dreaming in both non-REM and REM sleep, with associated differences in cortical activity (Siclari et al., 2017). A lack of later recall is also not straightforward proof that no experience occurred.

The relevant philosophical point is that aspects of self-awareness, responsiveness, and experience can vary while the organism remains alive. Such variation is compatible with the view that consciousness depends on particular modes of organization. It does not show that every state is captured by one threshold of recursive coherence, nor does it establish a direct encounter with ontological openness.

Dreaming, anesthesia, and other altered conditions should likewise not be collapsed into a single process. They can differ in physiology, responsiveness, content, and recoverability. RCO provides a vocabulary for asking how organization changes across states. The answers require empirical investigation, and the vocabulary should remain subordinate to the findings.

The self as a maintained identity

Selfhood includes continuity across change. A person recognizes past commitments, expects to act in the future, and is recognized by others. These relations are sustained through bodily continuity, memory, habits, social practices, and ongoing activity. They do not require an unchanging inner object, but neither do they become insignificant because they are constructed through processes.

The word constructed is easily misunderstood. A bridge is constructed and can still carry weight. A promise is socially constituted and can still create a serious obligation. In the same way, a self can emerge through biological and interpersonal organization while remaining a real center of concern, action, and responsibility.

The whirlpool analogy helps with continuity but reaches a limit here. A person can reflect on their identity, revise commitments, and respond to reasons. A whirlpool does none of these things. RCO must therefore add an account of embodied cognition and social recognition rather than assuming that fluid circulation already explains the person.

Narrative contributes to personal continuity by relating events, concerns, and expectations. Yet narrative is only part of the self. A person with impaired autobiographical memory does not thereby lose all identity or moral standing. The framework's emphasis on organization should widen attention to multiple forms of continuity rather than placing all of personhood in a single cognitive capacity.

When identity becomes rigid

The capacity to maintain an identity can also support defensive patterns. A person may treat a role, belief, or self-description as something that must be protected regardless of contrary evidence. Challenges to the description can then feel like threats to the entire

person. The response preserves coherence locally by excluding information that would require change.

RCO describes this as excessive stabilization of a self-model. The phrase is an interpretation of a pattern, not a diagnosis. It draws attention to a recursive loop: a belief organizes attention, attention favors confirming evidence, and the resulting evidence strengthens the belief. Similar loops can occur in groups when belonging and interpretation reinforce one another.

The problem is not identity itself. Commitments, boundaries, and stable preferences support meaningful life. Nor is every refusal to change evidence of rigidity. A person may resist a demand because it is harmful, coercive, or inconsistent with well-grounded values. Flexibility should not become a moral instruction to accommodate every pressure.

A better question is whether the identity can distinguish a threat to dignity or safety from a challenge to a revisable interpretation. The two can feel similar while requiring different responses. A coherent self should be capable of protection as well as revision. The aim is not to dissolve boundaries, but to understand which boundaries support agency and which merely preserve an avoidable mistake.

Suffering and the limits of an ontology

Some distress can be intensified by repetitive self-interpretation, defensive certainty, or attempts to control what cannot be controlled. RCO provides one way of understanding these patterns as interactions among attention, narrative, and feedback. It does not follow that all suffering originates in ego rigidity or resistance to impermanence.

Pain, illness, deprivation, violence, grief, and unsafe conditions cannot responsibly be reduced to a person's failure to remain open. A theory that explained every difficulty through the sufferer's attachment would obscure causes and responsibilities outside the person. Relational thinking should make those wider conditions more visible, not turn them into an excuse for blaming the individual.

Similarly, philosophical insight is not a substitute for appropriate care. Recognizing that a self-model is revisable may help someone think, but it is not a universal intervention. The book's account concerns how identity can be conceptualized. It does not establish a

clinical method or guarantee that contemplative practice will improve a particular person's condition.

The most defensible practical implication is selective flexibility. One can examine a recurring interpretation, consider what evidence sustains it, and distinguish a present situation from a familiar story about oneself. Sometimes the needed change lies in interpretation; sometimes it lies in the environment or a relationship. A relational account must remain open to both.

Continuity capable of revision

Flexible coherence in selfhood means remaining organized enough to act while being able to revise a mistaken account of oneself or the world. It includes the capacity to sustain commitments, tolerate uncertainty, recognize dependence, and respond to new conditions. None of these capacities requires permanent certainty about one's essence.

Consider a person whose professional role has become their entire account of worth. Losing the role can destabilize much more than employment. A relational reconstruction would identify the skills, relationships, values, and bodily routines that also sustain the person's life. The aim would not be to declare the loss unreal. It would be to discover forms of continuity that the narrow self-description had concealed.

The same principle can apply to growth without crisis. Learning can change a person's capacities while preserving meaningful commitments. New relationships can alter identity without destroying it. A self can become different through its own activity and remain continuous enough to recognize that development as part of its history.

RCO therefore treats selfhood as real, dependent, and revisable. It proposes an organizational approach to consciousness while acknowledging the unresolved problem of subjective experience. The framework's value lies in making those questions more precise: what sustains a perspective, how does it become a self, and how can that self remain responsive without losing its capacity to participate in a shared world?

CHAPTER 7

Meaning as Relational Coherence

Where significance arises

A letter is a physical object, but its significance cannot be read from its material composition alone. It may be an invitation, an apology, or a record of someone who has died. Its meaning depends on language, history, relationships, and the purposes through which it is encountered. The paper matters as part of an organized relation between a world and an interpreter.

RCO understands meaning in this relational way. Meaning is not an additional substance concealed inside an event. It emerges through the organization of perception, memory, feeling, concepts, action, and shared practices. This makes meaning dependent on conditions, but it does not make it unreal. A promise can change what people owe one another, and a discovery can change the course of a life.

Different forms of meaning should nevertheless be distinguished. The meaning of a sentence concerns how it functions in a language and context. The meaning of an event for a person concerns its place in a life. A meaningful activity may involve engagement without an explicit interpretation. These forms can interact without being reduced to one interchangeable quantity called coherence.

The framework's proposal is that each involves relations that organize significance. A word becomes intelligible through use and distinction; an event becomes important through its relation to concerns; an activity becomes fulfilling through the capacities and commitments it engages. The exact account changes with the case, but isolated objects do not supply the full explanation.

Constructed meaning and real constraints

Calling meaning constructed can suggest that anyone may assign any meaning without consequence. That inference overlooks the constraints under which interpretation works. A sentence can be

misunderstood. A promise can be misrepresented. A theory can fit a person's wishes while failing to describe the world. Relational construction leaves room for error because relations can be identified well or badly.

Meaning is constrained by material circumstances, public conventions, other people's perspectives, and the effects of acting on an interpretation. A bridge does not become safe because it symbolizes security. Another person's refusal does not become consent because a preferred narrative requires it. A relational ontology should make the independence of these constraints explicit.

At the same time, significance is not exhausted by factual description. Two people can accurately understand the same event while finding it differently important. A childhood home, a public ceremony, or an ordinary meal can acquire a place in one life that it does not have in another. Such differences need not imply that one person's experience is fraudulent.

The distinction is between interpretation of what occurred and the value it has within a life. They interact, but neither should swallow the other. An event can be personally meaningful while a proposed explanation of it is unsupported. Conversely, an event can be well explained causally and remain deeply moving. Understanding why something happened does not cancel the relations through which it matters.

Semantic fidelity

Semantic fidelity is RCO's term for an interpretation's responsiveness to the relations it claims to describe. It asks whether a coherent account remains answerable to evidence, context, and correction. Internal consistency is valuable, but it is not sufficient. A story can fit its own assumptions while systematically excluding the world that would challenge it.

Consider a person who interprets a friend's silence as rejection. The interpretation may fit earlier experiences and produce a compelling emotional narrative. Yet the silence might reflect illness, distraction, or circumstances unknown to the person. Semantic fidelity requires checking the relevant relation rather than treating the feeling of coherence as confirmation.

The same principle applies to public explanations. A social narrative can unify a group by attributing every difficulty to one enemy. Its coherence may be strong because each new event is forced into the same pattern. Fidelity would require investigating whether the pattern actually explains the events, what evidence contradicts it, and how the narrative affects those it describes.

This gives coherence two distinct roles. It can describe the successful organization of a belief system, including a mistaken one. It can also contribute to a justified interpretation when joined to evidence and revisability. RCO's account of meaning depends on the second relation when it evaluates truth-directed understanding. Mere stability does not confer accuracy.

Narrative and a life through time

Narrative relates events across time. It selects a beginning, identifies developments, and connects what happened with what is now possible. Through narrative, a person can understand a disappointment as part of a learning process or recognize a pattern that needs to change. The significance of an event often depends on the wider sequence in which it is placed.

Narrative also has limits. Life contains contingencies and unresolved events that do not fit a satisfying arc. Requiring every loss to serve a greater purpose can distort experience and suppress grief. A coherent life does not need to be a story in which everything was necessary or beneficial. Sometimes an honest account includes accident, waste, and uncertainty.

RCO therefore treats narrative as a form of organization that can be revised. A person can preserve the reality of an experience while changing its interpretation. An earlier failure may remain a failure without defining the whole self. A relationship may have mattered even if it ended. Revision need not turn the past into a false story of inevitable progress.

Narratives also operate collectively. Institutions, families, and communities preserve accounts of origin, responsibility, and possibility. These accounts coordinate activity and transmit values. Their strength can support continuity, but it can also conceal exclusions or justify harm. A relational approach asks whose

experience is represented, whose is omitted, and what the story enables its participants to do.

Participation before explanation

Not all meaning begins as a narrative. Someone absorbed in making music, caring for a child, repairing an object, or walking through a familiar place may experience significance without explaining it. The activity organizes attention and participation before it becomes a statement about a life. Meaning can be enacted as well as described.

This matters because constant interpretation can interfere with the very engagement through which significance develops. A person need not ask at every moment whether an activity expresses their ultimate purpose. Sometimes the relations themselves carry the experience: responsiveness to another person, contact with a demanding craft, or attention to an environment larger than one's immediate concerns.

RCO can accommodate this without inventing a hidden metaphysical message. The event matters because of the organization of participation. Later reflection may articulate that significance, but it need not have been consciously represented throughout. Coherence can be embodied and interpersonal, not only conceptual.

Awe provides an example. The encounter with an immense landscape may shift the scale of a person's attention and reduce the dominance of familiar self-concerns. What follows can be gratitude, curiosity, or a changed perspective. The experience does not establish a cosmic intention, yet its consequences for a life can be real. Existential depth and evidential restraint can coexist.

When meaning becomes unstable

Meaning can weaken when the relations that supported it change. Work can lose its purpose, a community can fracture, or an inherited worldview can cease to be credible. The resulting disorientation is not simply the absence of a sufficiently positive story. It may reflect a real disruption in activities, relationships, and expectations.

A relational reconstruction would therefore look beyond interpretation alone. What forms of participation remain available? Which commitments still withstand examination? What material and

social conditions are needed for renewed engagement? New meaning may require changed practice and restored relationships as much as a revised narrative.

The process need not culminate in one total account of life. Several sources of significance can coexist: friendship, inquiry, care, creation, and ordinary enjoyment. Their plurality can make a life more resilient than an identity organized around a single purpose. This is a practical possibility suggested by the framework, not a formula that defines flourishing for everyone.

A person can also allow some questions to remain unresolved. Meaning does not require final certainty about the universe. A conversation can deserve attention before the origin of existence is explained. The inability to justify everything from an ultimate ground does not remove the reasons that arise within particular relationships and activities.

Significance without permanence

A recurring philosophical temptation is to demand that meaning last forever in order to count. Yet duration and significance are different questions. A meal can nourish, a performance can move its audience, and a friendship can transform the people involved even though each is finite. Their value is not retroactively erased by an ending.

RCO locates meaning within lived relations rather than in a guarantee of eternal preservation. This does not make loss easy. Precisely because a relation was real, its ending can matter. The framework should not turn impermanence into a reason to minimize attachment or grief. It offers a way of understanding why finite relations can support both fulfillment and sorrow.

The account also leaves room for disagreement. People can contest which relationships and activities deserve commitment. Coherence does not automatically decide those questions. Ethical reasoning becomes necessary when meanings conflict or when one person's sense of purpose depends on another's harm. Meaning and goodness are connected, but they are not identical.

The chapter's central claim is therefore specific: meaning arises through organized relations among interpreters, activities, and the world. It can be constructed without being arbitrary, embodied without being fully narrated, and temporary without being

insignificant. Its credibility depends on fidelity to what it interprets, while its depth depends on the forms of participation it makes possible.

CHAPTER 8

Synchronicity Without Hidden Forces

Taking the experience seriously

A person thinks of an old friend and then receives a message from that friend. A recurring theme seems to appear in several unrelated encounters. An event arrives at a moment when it speaks directly to a private concern. Such coincidences can be striking, and their personal significance is a legitimate subject of inquiry.

Jung used synchronicity to develop an account of meaningful coincidence that challenged a purely causal interpretation of correspondence (Jung, 1973). RCO retains the question of meaningful alignment while declining to treat the experience itself as evidence for a special connecting force. A coincidence can be real, memorable, and consequential without establishing the metaphysics through which someone interprets it.

The inquiry begins by separating three questions. What events occurred? How likely would a specified relation among them be under an appropriate comparison? Why did the relation matter to the person who noticed it? These questions can inform one another, but answering one does not automatically answer the others.

A felt sense of improbability is not a probability calculation. A statistically unusual pattern is not automatically a message. Personal significance need not be statistically unusual at all. Keeping these distinctions clear allows meaningful coincidence to be examined without either endorsing an unsupported cosmic explanation or dismissing the experience as worthless.

Alignment without direct coupling

Two processes can align without one directly causing the other. They may share an environment, respond to the same schedule, or depend

on similar developmental conditions. Two people can independently arrive at a meeting because each follows a timetable. The absence of direct communication at that moment does not remove the ordinary conditions that explain the alignment.

This is the restrained meaning of alignment without direct causal coupling. It does not mean absence of causation altogether. A common cause or shared constraint is still part of a causal account. The phrase should therefore not be used to smuggle acausality into a model whose actual explanation depends on ordinary relations.

Other apparent alignments arise through the way an observer selects and groups events. A concern can make certain themes more noticeable. A flexible category can join events that would otherwise be counted separately. A person may remember a striking match and forget the many occasions on which no match occurred. These possibilities concern the formation of a record, not the honesty of the observer.

Still other alignments may be ordinary coincidences. In a large field of events, some striking combinations will occur. RCO does not require a hidden structural explanation for every one. A naturalistic account must leave chance available rather than replacing supernatural necessity with an equally unfalsifiable claim that every coincidence reveals recursive organization.

Meaning and the observer

The significance of a coincidence often depends on a particular life context. The same date or image can be ordinary for one person and emotionally charged for another. This is consistent with the previous chapter's account of meaning: importance arises through relations among memory, concern, interpretation, and events.

A person may reasonably use an encounter as an occasion for reflection without claiming that it was arranged for that purpose. A book found by chance can introduce an idea that changes a life. Its usefulness does not require evidence that the universe selected it. The meaningful consequence is part of what happens after the encounter, not necessarily a cause that explains why it occurred.

This distinction creates room for a non-mystical interpretation of synchronicity. The event can become a focus of relational coherence within a person's experience. It brings concerns, memories, and

possibilities into an intelligible pattern. That interpretation describes the organization of significance; it does not yet demonstrate unusual clustering in the external world.

A good account remains responsive to correction. If a date was remembered inaccurately, if a connection depended on omitted events, or if a supposed prediction was formulated only afterward, the empirical interpretation should change. The event may retain personal significance even when a proposed statistical or causal explanation fails. Meaning does not need protection from every factual revision.

Timing structures as research hypotheses

The proposal of recursive timing lattices can be developed as a research question: do defined classes of events cluster near specified temporal intervals more than an appropriate comparison would predict? Age-based coordinates, developmental transitions, and proposed harmonic intervals are possible modeling choices. Their value depends on how clearly they are specified and how they perform against alternatives.

A Fibonacci-based timing model is one candidate among many. Its mathematical elegance does not grant it evidential priority. A regular interval, an age-dependent baseline, or a model based on social schedules may explain the same pattern as well or better. The relevant question is comparative performance under conditions that prevent the model from being adjusted to every observed event.

An age coordinate can be useful when investigating development because it aligns events with a person's life history. Calendar time can be useful when investigating shared social or environmental events. Neither is inherently superior. The coordinate should follow the hypothesis, and the effects of trying several coordinates must be included in the evaluation.

The present book does not provide a dataset, a reproducible analysis, or a confirmed estimate of harmonic clustering. Timing lattices and selective attractors are therefore presented as proposed models rather than established discoveries. This status does not make them unworthy of investigation. It identifies the work required before they can support stronger conclusions.

A credible test

A test should begin with a defined class of events and a way of recording them that does not depend on their fit to the preferred pattern. If only memorable matches enter the dataset, the analysis cannot distinguish a temporal effect from the selection process. The record should include eligible non-matches and explain how event dates and uncertainty are handled.

The proposed intervals and the main outcome should be set before evaluating the evidence that will be used to judge them. If an exploratory analysis suggests a pattern, it can guide a later test on independent material. Exploration is valuable, but a pattern discovered through repeated adjustment should not be presented as though it had been predicted in advance.

The comparison model must represent the relevant opportunities for an event to occur and be recorded. Life events are not necessarily distributed uniformly across age. Several events from one person's life may be dependent. Cultural schedules, reporting habits, and periods with better records can create apparent concentrations. A credible analysis addresses those features rather than treating every date as an interchangeable draw.

Continuous proximity measures may be more informative than a simple hit-or-miss count. An event can be assigned a distance from a prespecified timing point, with the scale and uncertainty defined. But a continuous measure is not automatically unbiased. A dense enough grid places almost every event near some point, so proximity must be evaluated relative to a comparison with the same opportunities for a match.

Testing multiple intervals, event categories, or subgroups creates further chances to find an apparently strong result. The analysis must account for the search it actually performed. It should also report effect sizes and uncertainty, including results that do not favor the model. Independent replication matters because a complex fit can look persuasive in the material from which it was developed.

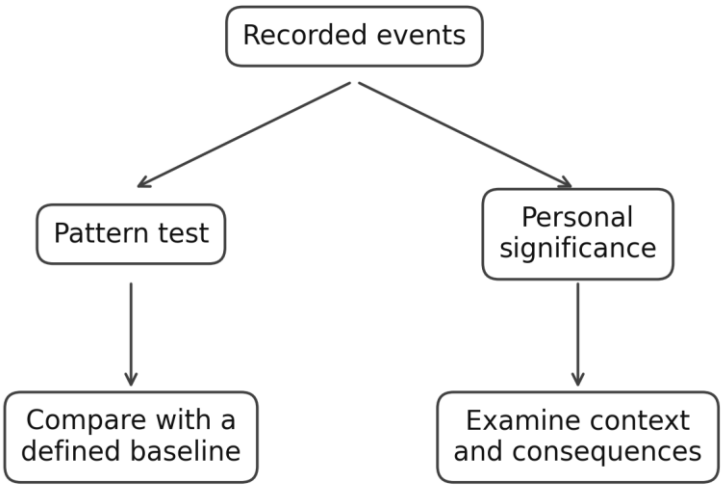

Figure 5. Two questions about a coincidence. A test of temporal pattern and an account of personal significance require different evidence; one does not automatically answer the other.

Selective clustering and explanation

Suppose a well-designed analysis found that some intervals performed better than others. That result would justify further investigation, not an immediate conclusion about a universal attractor. Alternative explanations could include common schedules, age-related changes, measurement artifacts, or unmodeled dependencies. A selective pattern can narrow a question without settling its mechanism.

The term attractor has a technical dynamical meaning, introduced in Chapter 4. A cluster in event times is not automatically an attractor in that sense. To make the stronger claim, a model would need to explain how relevant trajectories tend toward the identified region. Until then, preferred timing region or observed concentration is more precise.

Likewise, a replicated association would not show that an event carries a message intended for a particular person. Statistical structure and semantic significance are distinct. The former concerns a distribution under a model; the latter concerns the event's place in an interpretive life. RCO's relational account can connect them without assuming that one supplies the intention behind the other.

A null result would also be informative. It could show that a particular timing model adds no useful explanation beyond the comparison. That would not disprove every part of RCO, because the broader ontology does not logically depend on Fibonacci timing. It would require the empirical proposal to be narrowed, revised, or abandoned. Openness must include that possibility if the research is to remain credible.

A disciplined place for coincidence

The strongest naturalistic account need not begin by deciding that every coincidence is either cosmic communication or meaningless noise. It can examine the event, the conditions that shaped it, the process by which it was noticed, and its consequences for the person. Some cases may be explained by shared constraints, others by selection and chance, and many by a combination.

For practical life, the distinction between an invitation to reflect and a reason to act is useful. An emotionally resonant coincidence can prompt a question. Decisions that affect relationships, safety, or resources still require ordinary evidence and judgment. The strength of a feeling does not transfer automatically to the truth of an external claim.

RCO's contribution is to locate meaningful alignment within relational organization while preserving the difference between experience and explanation. Synchronicity can be studied as a phenomenon of salience, interpretation, and possible external pattern. Its investigation becomes more interesting when the framework permits the evidence to decide which parts of an attractive story survive.

CHAPTER 9

Ethics and a Relational Civilization

From description to responsibility

An ontology describes what exists and how it is related. Ethics asks what deserves care, what people owe one another, and how competing claims should be judged. The transition between them cannot be made by changing vocabulary alone. Knowing that a system is coherent does not show that its continuation is good.

A coercive institution can sustain itself effectively. A group can become highly coordinated around cruelty. An exploitative arrangement can be stable for those who benefit from it. These examples show why ethical evaluation needs commitments beyond persistence, integration, and adaptive success. Without those commitments, relational language could become a sophisticated defense of whatever happens to endure.

The ethical orientation developed here begins with explicit commitments to reducing avoidable suffering, respecting persons and their agency, supporting fair cooperation, and protecting the conditions of worthwhile life. These are normative commitments. They are not deductions from thermodynamics or consequences of a mathematical recurrence. RCO contributes an account of dependence and consequences through which those commitments can be pursued more carefully.

The framework's opposition to final metaphysical grounding also does not prove that every moral claim is merely subjective. Different ethical theories can defend reasons that are not reducible to individual preference. RCO's contribution is more specific: it favors an ethics that can justify its commitments, examine their effects, and remain responsive to criticism without requiring a completed account of the ultimate structure of reality.

This position demands more than saying that values are relational. Relations can be unequal, manipulative, or violent. An ethical account must identify whose interests count, what kinds of harm matter, and which forms of treatment cannot be justified by an aggregate gain. The questions remain difficult, but making them explicit is better than allowing coherence to answer them by implication.

Flourishing as more than survival

A living system can survive under conditions that offer little opportunity to flourish. A person can become highly adapted to deprivation while lacking safety, choice, or meaningful participation. Adaptation is therefore an incomplete ethical standard. A system's ability to continue must be assessed alongside the quality of life that continuation supports.

Within RCO, flourishing includes enough stability to sustain a life and enough responsiveness to develop within changing conditions. It also requires attention to embodied needs, relationships, agency, and the opportunity to participate in activities that matter. The precise shape of a good life can vary, but it cannot be defined solely as the efficient preservation of an existing organization.

This expands the earlier idea of flexible coherence. A person's flexibility is valuable when it supports worthwhile activity and protects agency. It is not valuable merely because it makes the person easier to fit into an unjust environment. Sometimes flourishing requires resistance, separation, or a durable boundary rather than further accommodation.

Likewise, a community's stability should be judged partly by what it makes possible for its members and those affected by it. Stability that depends on silencing criticism may be organizationally effective in the short term while ethically unacceptable. A relational account should trace the costs displaced beyond the apparent boundary of success.

Rules that enable trust

Rules and commitments can create freedom by making cooperation possible. A reliable promise reduces uncertainty. A fair procedure allows people to coordinate without renegotiating every condition. A

protected right can give someone room to act even when others dislike their choices. Constraint and flourishing are not opposites.

The problem arises when a rule's continued existence becomes its own sufficient justification. Institutions can defend procedures because the procedures preserve the institution, even after their original purpose has been lost. The recursive maintenance that supports reliability can become an obstacle to correction. Ethical reflection asks whether the maintained pattern still serves defensible ends.

Revisability should itself be organized. If every commitment can be abandoned whenever it becomes inconvenient, trust dissolves. A coherent ethical practice distinguishes between applying a rule, interpreting it under unusual conditions, and revising it through a fair process. Openness requires procedures and reasons, not simply permission to improvise.

The analogy with feedback is useful here. A rule should be able to encounter information about its consequences. Yet feedback must include the people who bear its costs, not only the administrators who measure its efficiency. A system that registers complaints as threats rather than evidence has narrowed its capacity to learn.

Institutions and the distribution of power

Institutions are sustained through people, resources, records, norms, and authority. Their apparent solidity can obscure how much work goes into reproducing them. RCO makes this work visible. A law, a university, or a market is neither an eternal object nor a mere illusion; each is an organization whose continuity depends on recognizable practices and material support.

This perspective invites questions about power. Who can define the institution's goals? Who can challenge a decision? Who controls the records through which performance is assessed? Who can leave, and at what cost? A system may appear coherent because those who disagree have little opportunity to make their experience count.

Institutional flexibility is therefore not enough. An authority can adapt very effectively in order to preserve domination. The relevant ideal joins adaptability to accountability, fair participation, and protection against abuse. These values supply the ethical direction that a purely dynamical account lacks.

RCO favors arrangements in which criticism can affect decisions, errors can be corrected, and responsibility remains identifiable. These are political commitments consistent with the ontology, not uniquely entailed by it. A claim that one entire political program follows directly from the structure of reality would repeat the absolutism the framework questions.

Polarization and shared inquiry

Groups can stabilize identity through repeated distinctions between insiders and outsiders. Shared language, selective information, and mutual reinforcement can produce a coherent interpretation that is difficult to revise. The stronger the link between a claim and membership, the more a factual disagreement can feel like an attack on belonging.

Relational analysis asks how this pattern is maintained. Which incentives reward certainty? Which channels select information? Which encounters are possible across the boundary? It does not assume that every conflict is a misunderstanding or that all positions deserve equal acceptance. Some disagreements concern genuine harm and incompatible interests.

The useful goal is a capacity for shared inquiry where it is possible. Participants need ways to distinguish disagreement about evidence from disagreement about values, and both from struggles over resources and authority. A vague call for coherence can conceal those differences. Clearer distinctions can make disagreement more productive even when agreement remains limited.

A healthy public culture also needs room for principled refusal. Openness should not require people to surrender established protections or continually debate their basic standing. The framework's emphasis on revisability applies to arguments and institutions while remaining joined to its commitments concerning dignity, agency, and fair treatment.

Ecology and dependence

An ecological perspective makes dependence difficult to ignore. Human activity relies on material flows, living systems, and environmental conditions that cannot be treated as an unlimited

external background. A system can appear efficient when the costs of its maintenance are excluded from the boundary of accounting.

RCO encourages wider attention to those relations. A product's usefulness is one part of its story; the conditions of production, use, and disposal are also relevant. A policy's local success can coexist with damage elsewhere. Relational reasoning asks whether the chosen description has hidden dependencies that are essential to its apparent achievement.

This does not mean that a general ontology can determine an environmental policy without evidence. Particular decisions require measurements, comparison of alternatives, and attention to uncertainty. The philosophical contribution is to resist descriptions that treat human systems as independent of the conditions supporting them.

The ethical question concerns whose lives and opportunities are affected across time and distance. Ecological organization matters both because humans depend on it and because an ethical outlook may recognize value beyond immediate human use. The framework can support such inquiry without pretending that one term, coherence, settles every conflict among environmental values.

Economics and the purpose of coordination

Economic arrangements coordinate activity through institutions, expectations, resources, and patterns of exchange. They are historically formed systems rather than natural objects with one unavoidable design. This does not make them infinitely malleable. Existing capacities, dependencies, and incentives constrain what can be changed and how.

A relational evaluation asks what the system enables people to do, what vulnerabilities it creates, and how benefits and burdens are distributed. Growth in one measure can accompany declining security, deteriorating relationships, or damage to future conditions of life. Conversely, a stable system can fail people if it preserves deprivation. Neither growth nor stability is a sufficient description of flourishing.

The practical implication is to examine the relation between means and ends. Production, finance, and technological capability are forms of coordination whose value depends partly on the lives they support.

RCO's ethical commitments give reason to consider resilience, agency, and fair opportunity alongside output, while leaving particular economic proposals open to substantive analysis.

The framework also cautions against romanticizing disruption. Reorganization can create opportunity, but people bear the costs of transitions unevenly. A system's long-run adaptability does not by itself justify imposing severe losses on those least able to absorb them. The relevant unit of concern includes persons and communities, not only the survival of an aggregate arrangement.

Education and creative development

Education can cultivate stable capacities and the ability to revise their use. Knowledge, technique, and memory are not enemies of flexibility. They often make intelligent revision possible. A person cannot evaluate every claim effectively without learning enough about the domain to recognize what counts as a reason.

The ideal is therefore neither rigid memorization nor perpetual unstructured exploration. It is a developing ability to use inherited knowledge, understand its limits, and respond to new problems. RCO's account of constraint helps explain why disciplined practice can enable creativity rather than suppress it.

A musical form constrains a performance while giving the performer something through which to act. A scientific method constrains inference while making results more answerable to others. A craft develops habits that free attention for higher-level judgment. Creative openness often depends on capacities that have been stabilized through sustained effort.

Education should also make the social conditions of learning visible. Access to time, safety, resources, and recognition affects what a learner can do. Treating achievement as the expression of an isolated inner essence can hide these relations. A relational account recognizes individual agency while asking how environments support or obstruct its development.

Technology and recursive amplification

Technology changes the conditions under which people perceive, coordinate, and act. Its effects can return to shape the behaviors that

guide further technological development. A system built to attract attention can alter what users attend to, and those changes can then influence what the system learns to present. This recursive relation deserves ethical scrutiny.

Evaluation should therefore extend beyond whether a tool performs its immediate task. What habits does repeated use encourage? What dependencies develop? Can users understand and contest consequential decisions? Does the system strengthen their capacity to act, or make them more dependent on an organization whose interests differ from theirs?

These questions do not imply that technology is inherently alienating. A tool can widen access, reduce burdens, and support creative or cooperative work. The point is that benefit depends on the relations in which a capability is embedded. A powerful system placed within a harmful incentive structure can amplify the harm efficiently.

Artificial intelligence makes these issues particularly clear because its outputs can enter decisions, self-interpretations, and public knowledge. Chapter 11 considers its philosophical significance. The ethical principle here is that increasing capability should remain connected to identifiable responsibility and to the interests of the people affected.

Existential depth without an absolute

A relational civilization need not eliminate experiences traditionally described as spiritual. Awe, reverence, gratitude, and a sense of participation can arise through encounters with nature, other people, art, and the limits of one's own understanding. Such experiences can matter without being treated as demonstrations of a supernatural explanation.

Their ethical value is not guaranteed by their intensity. A powerful experience can support care, but it can also be absorbed into certainty or self-importance. The relevant question is how it changes a person's relations and actions. RCO interprets existential depth as part of lived organization rather than as privileged access to a final metaphysical authority.

The resulting orientation is one of participation with responsibility. Human beings depend on conditions they did not

create, inherit institutions they can partly change, and affect lives beyond their immediate view. A good society would help people perceive and respond to those relations while protecting the agency through which they contribute.

The ethical promise of RCO lies here. It makes dependence visible, treats stability as something to evaluate rather than worship, and gives revision a disciplined place. Its values must still be defended, and its proposals must still answer to consequences. An unfinished world does not remove responsibility; it places responsibility within the continuing work of sustaining forms of life worth sustaining.

CHAPTER 10

Death Dissolution and Impermanence

The loss of a particular organization

If a person is a living organization rather than an unchanging substance, death concerns the irreversible loss of the conditions that sustain that organization. The description has an austere clarity, but it should not flatten the event into an abstract change of pattern. A particular person disappears from a network of relationships, commitments, and possibilities.

RCO understands human consciousness as dependent on organized bodily processes. It therefore gives no basis for assuming that a permanent observer remains intact when those processes irreversibly cease. This is a consequence of the framework's account of selfhood, not a complete empirical description of every aspect of dying or a proof about all imaginable forms of existence.

The distinction between dying and death matters. Dying can involve changing conditions and degrees of functioning. Irreversible loss of the conditions sustaining a person is not simply another reversible alteration of ordinary experience. The ontology should not use a broad vocabulary of transformation to blur the difference.

The whirlpool is useful again, within limits. When the conditions sustaining circulation disappear, the whirlpool does not remain as a separate vortex-object waiting somewhere else. Its constituents continue in other processes, but the particular organization is lost. Likewise, the continuation of matter or causal effects is not automatically the continuation of a person's perspective.

Sleep is a limited analogy

Sleep may help someone recognize that familiar self-awareness can change while bodily life continues. Yet it is a poor basis for claims

about personal survival after death. The sleeping organism retains many of the conditions through which waking activity can resume. Irreversible loss of those conditions presents a different situation.

The analogy is further limited by the variability of experience during sleep. Dreaming can occur in more than one sleep stage, and later recall does not provide a complete record of prior experience. As discussed in Chapter 6, the appropriate conclusion concerns variation in conscious organization, not a demonstrated encounter with nonexistence followed by a return.

It is also difficult to imagine one's own absence. A person may picture darkness, silence, or an empty space, but each image contains a perspective from which it is experienced. The difficulty of forming an image of no perspective does not establish that a perspective must persist. It reveals a limit in how imagination represents the question.

RCO therefore avoids turning phenomenological difficulty into ontological reassurance. It can examine how the self is maintained and how its organization changes. It cannot infer a surviving subject merely because the subject cannot picture its own absence from the inside.

Transitional experience and what it cannot establish

Reports from altered or extreme states can be vivid and personally important. Their interpretation requires careful attention to conditions, timing, memory, and the relation between experience and later report. A general ontology does not have the authority to assign every such report to one mechanism.

The possibility that some experience occurs while bodily and cognitive organization is changing does not by itself show that experience continues after the irreversible loss of the organization required for it. The two claims concern different conditions. Moving from one to the other requires evidence that the report alone does not supply.

RCO's account permits the study of transitional organization without installing an immortal substance. It also leaves particular scientific questions to the methods capable of investigating them. Its contribution is conceptual: organization can change, fragment, or cease without requiring a hidden essence to explain every stage.

This does not deprive an experience of significance. A person's interpretation of mortality can change after a profound event even when the event does not establish a metaphysical conclusion. Its psychological and relational consequences can be recognized while its explanatory claims remain open to examination.

Information and personal continuity

An informational description of a person can preserve facts, recordings, habits of expression, or aspects of a life history. These traces can matter to those who remain. They are not automatically the continuing person. A description and the organization described are different kinds of thing.

The question becomes more difficult when imagining an extremely detailed reconstruction or a future artificial model. Similarity in behavior would raise serious questions about identity, continuity, and recognition. RCO does not settle those questions by declaring that information is either sufficient or irrelevant. It asks how the proposed continuity is realized and which sense of identity is being claimed.

Numerical identity, resemblance, causal descent, and the continuation of a perspective should not be treated as interchangeable. A new system could inherit information from an earlier person without establishing that the earlier person's first-person life has continued. Conversely, rejecting a simple data-based account does not resolve every possible case of technologically mediated continuity.

What the framework rejects is the unsupported assumption that informational identity is eternally preserved in a hidden cosmic archive. Information requires an account of its organization and realization. Calling a pattern information does not make it immune to destruction or supply a bearer independent of the processes through which it exists.

Openness does not guarantee return

No-ground ontology proposes that reality lacks final metaphysical closure. This claim cannot be converted into a promise that a dissolved organization will return. Non-finality is not a mechanism of

resurrection, and it does not establish a cycle through which the same person reappears.

The point is easy to miss because the language of openness sounds hopeful. It can suggest that every ending secretly contains another beginning. Sometimes one organization does become part of the conditions for another. But the new organization need not preserve the identity, perspective, or relationships of what was lost.

RCO should therefore distinguish ontological openness from consolation about a particular future. It can deny that one physical ending answers every metaphysical question while fully acknowledging that the ending may be final for a life. Those claims are compatible because they concern different objects of inquiry.

The same distinction applies to cosmology. Even if an entire regime of organized complexity ceased, the no-ground thesis would remain a philosophical position about ultimate explanation. It would not establish that new worlds must form. A proposal about cosmic renewal would require a cosmological model and evidence of its own.

Grief and relational reality

A relational account makes grief more intelligible, not less necessary. The death of a person changes the organization of other lives. Familiar exchanges, shared expectations, and future possibilities are interrupted. What is lost is not only an isolated object but a living participant in relationships that helped shape the world of those who remain.

The continuing influence of a person is real in a different sense. Their actions may persist in memories, habits, institutions, work, and the capacities of others. These continuities can be valuable without being confused with personal survival. They are effects and inheritances through which a life remains consequential.

Grief also resists the demand that every disruption become a lesson. A framework centered on transformation can become cruel if it insists that loss must produce growth. Some losses remain painful without yielding a compensating benefit. Relational coherence should include the capacity to acknowledge an absence rather than forcing it into a story of progress.

Meaning after loss may involve preserving some relations in altered form while accepting that others cannot continue.

Remembering, caring for what someone valued, and allowing new attachments are possibilities, not duties imposed by the ontology. Their significance depends on the person and circumstances. No general account should dictate the pace or shape of grief.

Finitude and value

The demand for permanence often hides a mistaken standard of reality. A conversation can be worthwhile while it occurs. An act of care can reduce suffering at a particular time. A creative work can enrich lives without lasting forever. Their finite duration does not negate the consequences they had or the experiences they made possible.

This does not mean that duration is irrelevant. Preserving a valuable relationship or institution can be a serious responsibility. The point is that value is not all-or-nothing at the boundary between temporary and eternal. Many things matter partly because they are vulnerable and require care to continue.

Finitude can therefore redirect attention toward conditions of participation. What deserves time now? Which relationships need maintenance? What can be repaired while repair is possible? These questions do not require a final metaphysical answer. They arise from the concrete dependencies through which a life has significance.

RCO's account of mortality is neither a guarantee of personal continuation nor an argument that life is empty. It treats dissolution seriously and locates value in real, finite relations. A self can be temporary without having been unreal. A life can end without its having needed eternity in order to matter.

CHAPTER 11

Science Artificial Intelligence and Open Questions

An ontology in dialogue with science

RCO offers an interpretation of organization and grounding. Science investigates particular structures and processes through models, observation, experiment, and criticism. The two enterprises can inform one another, but their standards of success are not identical. A philosophical synthesis does not become an empirical theory simply because it uses scientific terms.

The framework's scientific usefulness would lie in the questions it helps formulate and the explanations it helps compare. It directs attention toward relations, maintenance, feedback, history, and the dependence of a system on its environment. These emphases are already important in systems and complexity research (von Bertalanffy, 1968; Kauffman, 1993; Mitchell, 2009). RCO brings them into a particular ontological interpretation rather than claiming to have originated them.

This distinction matters for evaluating originality. If the framework merely renames familiar concepts, its contribution is limited. Its stronger ambition is to connect an account of organized entities with a critique of final grounding, then explore the consequences for selfhood, meaning, and responsibility. The success of that synthesis depends on whether the connections clarify rather than obscure the component ideas.

A productive dialogue also permits scientific findings to resist philosophical expectations. If a favored model fails, the ontology should not redefine the result as another confirmation of openness. If a concept adds no explanatory value in a domain, it should be narrowed or omitted there. A framework that can interpret every possible result in its favor has lost a meaningful way to learn.

Different levels of a research claim

The statement that a system has recurrent interactions can be tested once the interactions are specified. The statement that those interactions explain a particular capacity requires a stronger demonstration. The statement that all reality ultimately consists of recursive organization is a broader philosophical thesis. Moving between these levels without acknowledgment creates the appearance of support that the evidence may not provide.

RCO's proposals should therefore be separated into conceptual, modeling, and empirical components. Conceptual work defines coherence, dependence, and grounding. Modeling work specifies variables and dynamics. Empirical work evaluates how well a model fits observations, predicts new cases, or supports interventions. Each component can fail in a different way.

A concept may be too vague, a model may omit a relevant mechanism, and an empirical effect may not replicate. Conversely, a useful model can survive even if its accompanying metaphysical interpretation is rejected. This modular evaluation is a strength. It allows worthwhile results to be retained without requiring allegiance to the entire framework.

The distinction also protects local explanations from inflation. A successful model of a particular developmental transition would be valuable. It would not automatically establish the ontology of all worlds. Scientific progress often comes through limited claims that withstand difficult tests. A broad framework becomes credible by respecting those limits rather than absorbing every success as proof of itself.

Physics and the question beneath spacetime

Research that questions the fundamentality of familiar physical structures provides an important motivation for RCO. Wheeler's discussion of information and physical inquiry, and the wider tradition of pregeometric thinking, invite examination of assumptions that ordinary descriptions take for granted (Wheeler, 1990). Work in quantum gravity similarly investigates questions about the status of spacetime (Rovelli, 2004).

These investigations do not establish that spacetime is a metastable vortex in the specific sense proposed by RCO. Nor do they establish a prephysical condition called recursive openness. Their relevance is that successful local descriptions need not identify an ultimate ontological layer. Theoretical physics can reopen questions about what a description presupposes.

RCO's role is interpretive. It can ask whether a proposed underlying structure is treated as an unexplained final ground and whether another formulation clarifies its dependencies. It cannot determine the correct equations of quantum gravity by philosophical preference. A physical theory must answer to mathematical consistency and empirical constraints appropriate to its domain.

The framework should also allow the possibility that a future theory is simpler or more foundational than expected. No-ground ontology would then need to assess the theory's claim to ultimacy carefully. It could not dismiss the scientific achievement merely because it appears to reduce the number of open questions. An ontology committed to inquiry must remain willing to encounter explanatory success.

Biology and organization across scales

Biological systems offer rich examples of organized dependence. Regulation, development, reproduction, and interaction with environments all make a purely isolated description inadequate. At the same time, the explanatory work is done by particular mechanisms and histories. Saying that life is coherence is not enough to explain how a cell maintains itself or how an organism develops.

A relational research approach would ask which interactions are necessary, which are redundant, and how the system changes when a relation is disrupted. It would examine the role of boundaries and the way resources support maintenance. It would also distinguish the persistence of an organism from the persistence of a lineage or ecosystem. The unit of analysis affects the explanation.

This approach can resist a simplistic opposition between reduction and holism. Studying components can reveal indispensable mechanisms. Studying organization can show why those mechanisms behave differently in different contexts. The choice need not be

between isolated parts and an unexplained whole. Explanations can move among levels while preserving the relations that connect them.

RCO's contribution would be strongest where its concepts support such specific questions. It would be weakest where the same terms are applied to every case without changing what is measured or predicted. The framework should earn its place by improving explanation, not by requiring the reader to redescribe every scientific result in its vocabulary.

Artificial intelligence as an organizational case

Artificial intelligence provides a useful case because capacities associated with intelligence can be implemented through organized computational processes. Work in the field includes learning, representation, search, planning, and decision-making under different architectures and assumptions (Russell and Norvig, 2021). These capacities invite philosophical questions about which aspects of intelligence depend on biological form and which can be realized in other ways.

RCO interprets intelligent performance through organization rather than a fixed rational essence. A system's capacities depend on its architecture, training or construction, available information, and the context in which it operates. Its apparent individuality can conceal a network of contributions from data, designers, users, and infrastructure.

The word recursive must remain technically responsible. Some systems use explicit recurrence, iterative feedback, or self-monitoring; others do not use these features in the same way. Repeated generation, learning across training steps, and recurrent neural dynamics are distinct processes. An account that calls all computation recursive loses the ability to explain which organization is relevant to a particular capability.

The useful question is therefore not whether a system deserves a broad label, but how its components and interactions produce a specified performance. Can it update a representation, respond to error, sustain a plan, or adapt to a changed environment? Under what conditions does it fail? Such questions connect the philosophical interest in organization to an empirical analysis of capacities.

Intelligence and consciousness

Intelligence and consciousness should not be treated as interchangeable. A system can solve a problem or generate a persuasive description of experience without that behavior alone establishing subjective experience. Conversely, the moral significance of experience need not depend on unusually sophisticated intellectual performance.

RCO offers no reliable shortcut from linguistic fluency to consciousness. Its general claim that consciousness depends on organization leaves open which organization is sufficient, whether artificial systems can realize it, and how such a claim would be evaluated. The unresolved issues identified in Chapter 6 remain unresolved when the system is computational.

Self-description is particularly easy to overinterpret. A system may produce statements about its own states because of its design, training, or interaction context. Those statements are evidence about its behavior and perhaps about aspects of its processing. They are not automatically transparent reports from a conscious subject. Their interpretation requires a theory of what generates them.

The framework also avoids the opposite dogmatism. Dependence on manufactured components does not by itself prove that experience is impossible. RCO's non-essentialist orientation keeps the question open to a sufficiently developed account of organization and evidence. The appropriate stance is discriminating inquiry rather than certainty derived from either human resemblance or material difference alone.

Identity in human and machine systems

An artificial system's identity can be defined in several ways: a particular running process, a stored set of parameters, a continuing service, or an interaction history. These definitions can come apart. Two copies may behave similarly while existing as different processes. A service can retain a name while its underlying implementation changes.

Such cases illuminate the broader distinction between organizational resemblance and continuity. A person also changes materially while remaining identifiable, but the biological, social, and

experiential conditions differ. The comparison is useful when it clarifies those conditions rather than assuming that a digital copy and a human life share one unproblematic criterion of identity.

RCO directs attention to the relations through which an identity is maintained and recognized. Who treats the system as the same? Which records and capacities persist? What causal continuity connects its states? What practical or ethical purpose does the identity claim serve? The answers may differ across engineering, law, social interaction, and philosophy of mind.

This plurality need not make identity meaningless. It shows that a question about sameness requires a context and a criterion. A relational ontology can accommodate practical continuity while keeping deeper questions about personhood and perspective open. The result is more precise than simply declaring that every coherent pattern is a self.

Human and machine relations

An intelligent tool can become part of the environment through which a person thinks. It can organize information, suggest alternatives, or change the cost of carrying out a task. The person's resulting activity is then partly shaped by the tool, and the tool's use is shaped by the person's habits and goals. Cognition can be studied within this wider relation without erasing the difference between the participants.

A beneficial relation supports the user's agency and judgment. It helps make assumptions visible, permits correction, and makes it possible to understand the limits of an output. A harmful relation can produce dependence on apparent authority, amplify a preferred narrative, or conceal uncertainty behind fluent language. The quality of the interaction matters alongside the system's isolated benchmark performance.

Relational analysis also asks where responsibility lies. If a system is used in a consequential decision, the presence of complex organization does not dissolve the obligations of designers, operators, or institutions. Describing an outcome as emergent is not an explanation of why no one should answer for foreseeable harm.

The same principle applies to benefits. A capability becomes valuable through its use within real lives and institutions. RCO

therefore connects the philosophy of intelligence to the ethical questions of Chapter 9: which relations are being strengthened, who gains agency, and what forms of accountability remain available when the system changes?

What would strengthen or weaken RCO

At the conceptual level, RCO would be strengthened by sharper definitions and successful responses to the problem of relations without final relata, the status of emergent possibility, and the risk of making openness into a new absolute. It would be weakened if its central concepts remained interchangeable labels or if its argument relied on the conclusions it was supposed to establish.

At the modeling level, it would be strengthened by specific accounts that connect organizational measures to identifiable behavior. A model should state its domain and explain why its variables capture the relations of interest. It would be weakened if every observed outcome could be redescribed as coherence without changing the model or excluding any possibility.

At the empirical level, individual proposals would need independent testing. A timing model should improve on appropriate alternatives. An account of stability should predict responses to perturbation. A claim about cognition should distinguish relevant forms of organization from superficially similar ones. Failure would constrain the proposal under test, even when it did not settle the entire metaphysics.

The most important discipline is to preserve these levels. A metaphysical argument cannot rescue a failed empirical prediction, and a successful local prediction cannot establish every metaphysical claim. RCO becomes a serious research orientation when it makes its commitments and risks explicit. It becomes a closed doctrine if it treats openness as a word that protects it from all possible criticism.

Conclusion

A stable world does not have to be a world of immutable things. Organization can persist through change, and dependence can be part of an entity's reality rather than a reason to deny that reality. The whirlpool introduced this possibility; the following chapters developed its implications while keeping the metaphor within its limits.

RCO proposes that coherent entities arise through relational processes and that no entity, law, or formal totality should be assumed to provide final metaphysical closure. The first claim directs attention toward emergence, constraint, feedback, and history. The second remains a philosophical thesis about grounding. Their connection is the framework's central ambition, and their difference is essential to its credibility.

Within physical systems, persistence requires an account of conditions. Some organizations maintain themselves through active regulation; others persist under different forms of constraint. They can change, fail, or become the basis for further organization. None of this guarantees progress. A pattern's endurance must be distinguished from its truth, usefulness, or ethical worth.

Consciousness and selfhood bring the inquiry into lived experience. RCO proposes an organizational account without claiming to have solved the existence of subjectivity. Meaning emerges through relations among persons, activities, and the world. It can be constructed without being arbitrary, provided interpretation remains answerable to what it describes. Coincidence can become significant without supplying evidence of cosmic intention.

The ethical implications require explicit values. Coherence alone cannot distinguish a just institution from an efficiently sustained injustice. The framework becomes ethically useful when its attention to dependence is joined to concern for suffering, agency, fairness, and the conditions of worthwhile life. Openness then means a capacity for responsible correction, not an absence of commitments.

Mortality gives these commitments urgency. A finite life need not be protected by an eternal essence in order to matter. Its relationships and actions are real while they occur and can continue to shape other lives. Their impermanence does not erase their value, and their value does not remove the reality of loss.

The framework must finally accept the discipline it recommends. Its language should clarify rather than conceal, its models should expose themselves to failure, and its broader claims should remain open to serious alternatives. Recursive openness cannot function as an exemption from explanation. It is a commitment to continue examining what an explanation assumes.

To inhabit this view is to recognize both continuity and vulnerability. We are capable of sustaining organizations that make experience, understanding, and care possible. We are also dependent on conditions that exceed our control. The task is not to secure a final position outside that dependence, but to participate in it with attention, judgment, and responsibility.

Stable worlds are real. Their reality is a continuing achievement of relations.

Glossary

Attractor

In a specified dynamical system, a set toward which nearby trajectories tend under the relevant dynamics. A concentration in data is not automatically an attractor. Metaphorical uses should be distinguished from a mathematical model.

Coherence

Relations that sustain an identifiable organization or pattern of integration. The meaning depends on the domain. Coherence alone does not establish truth, goodness, consciousness, or long-term viability.

Constraint

A condition or relation that shapes accessible transitions, configurations, or actions. Constraints can restrict alternatives while enabling organized capacities. Their effects depend on how they are realized and on the system being considered.

Constraint accumulation

The process through which earlier activity changes the conditions of later activity. Examples include material restructuring, acquired skills, and institutional inheritance. The term does not imply that all forms of historical influence share one mechanism.

Emergence

The development of higher-level properties or patterns through organized interactions. An explanation of emergence identifies the processes and conditions through which the pattern arises rather than treating the term itself as a cause.

Flexible coherence

An organization that maintains useful continuity while retaining a capacity to respond to relevant change. Its appropriate form depends

on context and purpose. In ethical applications, it must be joined to explicit values concerning those affected.

Information

A family of concepts concerning distinctions, representation, uncertainty, and organized differences. RCO does not treat information as a self-subsisting metaphysical substance. A particular use should specify its physical, mathematical, or semantic sense.

Meaning

Significance arising through relations among interpreters, practices, activities, and the world. Linguistic meaning, personal importance, and existential fulfillment are related but distinguishable forms. Constructed meaning remains subject to contextual and factual constraints.

Metastability

Technically, persistence in a state that is not the most stable available state under specified conditions. More broadly in this book, relatively durable organization that remains capable of transition. Broader uses do not establish a literal physical energy landscape.

No-ground ontology

The philosophical proposal that reality does not terminate in a completely self-grounding entity, law, or formal totality. It rejects an ultimate explanatory substrate without denying local causes, reliable knowledge, or the reality of organized entities.

Ontological recursive openness

RCO's term for the proposed non-finality of ultimate grounding. It names an ontological commitment, not a measurable physical field, hidden agency, or reservoir from which future worlds are guaranteed to emerge.

Path dependence

Dependence of a system's behavior or accessible possibilities on the history through which its present organization formed. The effects of history are carried by present conditions rather than by a separate force located in the past.

Physical recursive openness

The framework's broad term for transformation, changing accessibility, feedback, emergence, and dissolution within physical systems. It is not identical to thermodynamic openness, entropy, uncertainty, or indeterminism; particular applications require more precise definitions.

Point-within-point recursion

A conceptual image for the renewed examination of an apparent final ground. It represents the reopening of explanatory questions, not literal spatial nesting or an empirical claim that universes are contained within particles.

Recursive asymmetry

The accumulation of changes whose consequences alter subsequent organization and are not simply erased by a superficial reversal. It provides an interpretive vocabulary for history and temporal direction, not a completed derivation of time.

Recursive stabilization

A process through which an organization's activity helps maintain conditions for its continued organization. It can involve feedback and accumulated constraints. It does not, by itself, imply conscious intention or establish a single universal mechanism.

Relational identity

Identity understood through continuity of organization, activity, history, and recognition. Its criteria depend on the domain. Material sameness, resemblance, causal continuity, and personal identity should not be assumed to be interchangeable.

Selective attractor

In the timing proposal, a hypothesized region associated with a higher concentration of specified events. Unless a dynamical model establishes attraction, preferred timing region is the more cautious expression. The proposal requires independent empirical testing.

Semantic fidelity

The responsiveness of an interpretation to the relations, evidence, and context it claims to describe. It distinguishes a merely internally coherent story from one that remains open to external correction.

Strong emergence

In one common usage, the appearance of fundamentally novel causal powers not fully accounted for by lower-level organization. Definitions vary. RCO generally favors organizational explanations while acknowledging unresolved debates, particularly concerning consciousness.

Synchronicity

Meaningful coincidence as experienced by an observer. In RCO, investigation separates the events, their statistical or causal explanation, and their personal significance. The experience alone does not establish a special force or intended message.

Weak emergence

A family of approaches in which higher-level organization arises from lower-level interactions without a new independent substance or fundamental causal power. Bedau's technical account links weak emergence to derivation through simulation; broader usage requires qualification.

References

Aristotle. (1998). *Metaphysics* (H. Lawson-Tancred, Trans.). Penguin Books. (Original work written in the fourth century BCE)

Bedau, M. A. (1997). Weak emergence. *Philosophical Perspectives*, 11, 375–399. https://doi.org/10.1111/0029-4624.31.s11.17

Clark, A. (2016). *Surfing uncertainty: Prediction, action, and the embodied mind*. Oxford University Press.

Descartes, R. (1996). *Meditations on first philosophy* (J. Cottingham, Trans.). Cambridge University Press. (Original work published 1641)

Einstein, A. (2001). *Relativity: The special and the general theory*. Routledge.

Friston, K. (2010). The free-energy principle: A unified brain theory? *Nature Reviews Neuroscience*, 11, 127–138. https://doi.org/10.1038/nrn2787

Jung, C. G. (1973). *Synchronicity: An acausal connecting principle* (R. F. C. Hull, Trans.). Princeton University Press. (Original work published 1952)

Kauffman, S. A. (1993). *The origins of order: Self-organization and selection in evolution*. Oxford University Press.

Kuhlmann, M. (2010). *The ultimate constituents of the material world: In search of an ontology for fundamental physics*. Ontos Verlag. https://doi.org/10.1515/9783110326123

Lewis, D. (1986). *On the plurality of worlds*. Blackwell.

Mitchell, M. (2009). *Complexity: A guided tour*. Oxford University Press.

Newton, I. (1999). *The Principia: Mathematical principles of natural philosophy* (I. B. Cohen and A. Whitman, Trans.). University of California Press. (Original work published 1687)

Prigogine, I., and Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*. Bantam Books.

Reynolds, C. W. (1987). Flocks, herds and schools: A distributed behavioral model. *ACM SIGGRAPH Computer Graphics*, 21(4), 25–34. https://doi.org/10.1145/37402.37406

Rovelli, C. (2004). *Quantum gravity*. Cambridge University Press.

Russell, S., and Norvig, P. (2021). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Siclari, F., Baird, B., Perogamvros, L., Bernardi, G., LaRocque, J. J., Riedner, B., Boly, M., Postle, B. R., and Tononi, G. (2017). The neural correlates of dreaming. *Nature Neuroscience*, 20, 872–878. https://doi.org/10.1038/nn.4545

Strogatz, S. H. (2015). *Nonlinear dynamics and chaos: With applications to physics, biology, chemistry, and engineering* (2nd ed.). Westview Press.

Tegmark, M. (2014). *Our mathematical universe: My quest for the ultimate nature of reality*. Knopf.

von Bertalanffy, L. (1968). *General system theory: Foundations, development, applications*. George Braziller.

Wheeler, J. A. (1990). Information, physics, quantum: The search for links. In W. H. Zurek (Ed.), *Complexity, entropy, and the physics of information* (pp. 3–28). Addison-Wesley.

Whitehead, A. N. (1978). *Process and reality* (D. R. Griffin and D. W. Sherburne, Eds.). Free Press. (Original work published 1929)