

Scale-Free Structures

Is Knowledge Just the Recurring Emergence of a Universal Structures Across Scale?

Derek Cabrera^{a,b,@} and Laura Cabrera^{a,b}

a: Cornell University

b: CabreraLab

@: dac66@cornell.edu

ABSTRACT: This paper builds on prior work proposing that DSRP (Distinctions, Systems, Relationships, Perspectives) names a minimal set of organizing roles shared by cognition and reality ($\mathbb{M} = \mathbb{I} \cdot \mathbb{O}$; $\mathbb{R} = \mathbb{I} \cdot \mathbb{O}$) [1–6]. If the same eight elemental roles constrain both mental models and the world, then finding the same structural grammar across disciplines is not coincidence—it is a consequence of constraint. We test a falsifiable implication of this view: that explanations which achieve closure about a phenomenon will consistently externalize the full set of elemental roles and show non-trivial co-implication among them, whereas non-explanatory controls will not. Using fixed excerpts from multiple disciplines, plus narrative and raw-data controls, we apply a conservative, rule-based coding protocol to quantify elemental role coverage, Structural Co-Implication Index (SCI), and recursion indicators; robustness is assessed by independently executing the identical protocol on a second LLM. Results show that explanatory discourse reliably exhibits high role coverage and high co-implication relative to controls, consistent with a principle of Structural Confinement: when one tries to isolate structural roles, structure re-emerges because explanatory closure requires co-implicated organization. We do not claim DSRP is the “material” of reality; rather, it names closure constraints and structural roles that coherent systems and coherent explanations must satisfy. On this view, improved understanding comes less from accumulating content alone and more from correcting default structural bias so that the organization of mental models increasingly aligns with the organization of their targets ($\mathbb{M}/\mathbb{R}$).

KEYWORDS: DSRP | O-Theory | Structural Confinement | Fractal Structure | Systems Thinking | Ontological Structure | Cognitive Architecture | Scale-Free Organization | Universal Grammar | Love Reality Loop

Cite this paper: Cabrera, D., & Cabrera, L. (2026). Scale-free structure: Is knowledge just the recurring emergence of universal structures across scale? *Journal of Systems Thinking*, 6(1), 1–40.

<https://doi.org/10.54120/jost.v25i1.dc6usfs6>

1.0 The Recurring Pattern that Connects

This paper extends the structural claims made in DSRP *Ontology* [7], *Enclosure* [1], *Calculus*, [2] *Structure* [3], *Emergence* [5] and *O-theory* [6], which explained that both the world ($\mathbb{R}$) and the mind ($\mathbb{M}$) are structured by the same organizational grammar—DSRP—and that model–reality alignment depends on the degree to which the structure of thought mirrors the structure of reality. Here, we extend that claim by examining what happens when a structure is not merely shared, but recurs—across disciplines, across domains, and across orders of magnitude.

Every field of knowledge seems to rediscover the same structural features. Physics calls it symmetry and confinement. Biology calls it emergence and hierarchy. Logic calls it negation. Information theory calls it signal and noise. Philosophy calls it identity and otherness. The names change, but the underlying grammar does not. This raises a deeper question: Why?

The answer, we propose, is *structural confinement*. There are limits to how far things can be pulled apart—both cognitively and physically. You cannot sever D from S, or R from P, without triggering their reappearance. Try to isolate a quark, and you get more quarks. Try to isolate a distinction, and you get more distinctions. The structure resists decomposition because it is not made of separable parts; it is made of *co-implicated patterns*.

A note on claim-type is necessary at the outset. This paper is not claiming that DSRP is the “material” of reality, nor that physics concepts should be read as cognitive metaphors. Rather, it claims that DSRP names a minimal set of structural roles and constraints that are instantiated in both cognition and physical systems, and that these roles reappear because they are necessary for system closure at any scale. In other words, not that DSRP is the “material” of reality, but that it is the structure of reality. In this sense, DSRP functions as an epi-ontic grammar: an organizational interface that minds evolved within, and an organizational constraint that physical systems exhibit without minds.

This paper makes three separable contributions framed as three claims. *Claim 1 (Theoretical)*: Structural Confinement—attempts to isolate structural roles regenerate structure because closure requires co-implicated organization [1]. *Claim 2 (Empirical signature)*: Across multiple unrelated disciplines, explanatory discourse that achieves constraint-anchored closure reliably externalizes the full set of DSRP elemental roles and exhibits non-trivial co-implication and recursion, whereas matched non-explanatory controls do not. *Claim 3 (Operational protocol)*: A replicable measurement method (fixed excerpts, conservative role-coding rules, and summary metrics such as elemental role coverage, SCI, and recursion indicators) enables independent reproduction, audit, and extension of the analysis. Together, these claims frame DSRP not as a domain framework but as a minimal epi-ontic grammar that explanatory systems are repeatedly forced to make explicit under alignment pressure.

This paper explores that recurrence as more than just an artifact of cognition—it is a feature of the universe. DSRP is not merely an *epistemological* framework humans use to describe the world; it is a proposed description of the *ontological* structural constraints that both cognition and reality must satisfy in order to cohere. Thus, DSRP is *epi-ontic*. It is the universal grammar of knowledge, and its recurrence is not a loose analogy; it is a claim of scale-free structural recurrence—testable in the organization of

explanation and (by extension) consistent with the organization of the world those explanations attempt to model. This paper contributes one additional line of convergent validity by testing whether structurally unrelated explanatory corpora converge on the same minimal grammar under constraint, with controls designed to show the effect is non-trivial.

2.0 Structural Confinement: A Law of Regenerative Structure

In quantum chromodynamics (QCD), the phenomenon of confinement states that quarks cannot be isolated. The more energy you put into trying to separate them, the stronger the binding force becomes. Instead of freeing a quark, the system reacts by generating new quark–antiquark pairs. What looks like rupture becomes reproduction. Structure doesn’t fracture—it regenerates.

This is not an anomaly of particle physics. It is the expression of a deeper structural law. The same principle applies in cognition. DSRP structures are also confined: try to isolate one—say, a Distinction—and you immediately invoke its Other. That duality forces you into a System (What is this part of?), which then demands Relationship (How does it connect?), and ultimately Perspective (From where is this seen?). The patterns do not stand alone. The more you pull on one thread, the more the others reveal themselves.

This behavior is not additive. It is recursive. Attempts to simplify cognition by treating these patterns as modular or optional result in structural multiplication. What appears as decomposition becomes proliferation. Try to reduce DSRP and you just get more DSRP.

We call this *structural confinement*: a conservation law not of energy, but of organization. You cannot subtract structure; you can only rearrange it. The system preserves itself—not arbitrarily, but necessarily.

This is why the world holds together, and why every scientific model that works eventually rediscovers the same grammar. It’s not because theorists are imitating each other. It’s because they are all, whether in QCD or cognition, bouncing against the same constraint: a structure that refuses to be pulled apart.

3.0 Fractal Recurrence: DSRP Across Scales and Disciplines

If structural confinement explains why DSRP elements resist isolation, then *fractal recurrence* explains why they keep appearing—across disciplines, across timescales, across physical scales. DSRP is not a metaphor. It is not an interpretive lens. It is a structural attractor that reappears in every valid system because no other configuration yields coherence.

In physics, particle interactions governed by SU(3) symmetry exhibit distinctions (quark vs. anti-quark), nested systems (mesons, baryons), recursive relationships (gluon fields), and global constraint frames

(e.g., gauge invariance and color-neutral closure). These are not “perspectives” in a mental sense; they are constraint-structures—reference frames—that define what counts as allowable organization. In DSRP Theory, “Perspective” names the point–view relation ($\dot{p}$ – v): a structural referential frame, not the everyday psychological meaning of the word. In biology, systems unfold from genes to cells to organisms to ecosystems. In neuroscience, circuits and feedback loops mirror dynamic systems organized relationally. In logic, negation and implication are forms of structural opposition. In language, syntax trees and recursion express part–whole and framing.

These are not analogies. They are instantiations of the same grammar. The claim is not that fields “use DSRP language,” but that their explanatory cores repeatedly require the same functional structural roles: identities bounded by others, parts composing wholes, interactions producing constraint-maintained closure, and frame conditions that determine what counts as coherent. It is not that these fields look like DSRP; it is that they instantiate DSRP-like structure—whether expressed in quark color, brain networks, or symbolic discourse.

Table 1 illustrates this recurrence across diverse domains. In each case, the pattern reappears not because the disciplines are converging intellectually, but because they are structurally *constrained* to converge ontologically.

Table 1. Recurrence of DSRP Structures Across Disciplines. This table presents selected examples of how the core patterns of Distinction, System, Relationship, and Perspective reappear under different names and forms across a range of fields. Note: This table illustrates only a subset of observed recurrences. The recurrence is fractal and continues across other scales and contexts.

Discipline	Phenomenon or Concept	DSRP Pattern(s) Present	Name Used in Field
Physics (QCD)	Quark confinement	Co-implication of identity, relationship, system	Color charge, confinement, asymptotic freedom
Biology	Cell → tissue → organ → organism → ecosystem	Nested systems, emergent relationships	Hierarchy, holarchy, levels of organization
Neuroscience	Neural circuits and feedback loops	Systemic organization, causal relationships	Network dynamics, plasticity, functional integration
Logic	Binary oppositions, implication	Distinction and relationship	Law of identity, negation, implication
Linguistics	Grammar, syntax trees	Part–whole systems, distinctions, nested perspectives	Phrase structure rules, recursion, pronoun resolution

Philosophy	Self/Other, subject/object, perspectivism	Distinction, identity/other, framing	Dialectic, phenomenology, dualism
Information Theory	Signal vs noise, sender/receiver model	Distinction, relationship, perspective	Shannon model, entropy, coding
Organizational Design	Role hierarchies, decision flows, boundaries	Distinctions, nested systems, point-view perspectives	Org charts, roles, structure/process split
AI / ML	Knowledge graphs, embedding space relationships	Distinctions, systems, relational edges, perspective	Vector similarity, graph representation learning
Education / Learning	Concept mapping, perspective-taking, classification	Distinction, perspective, relationship, system	Metacognition, learning taxonomies, scaffolding
Narrative / Literature	Framing devices, character relations, plot arcs	Perspective (p/v), system of parts, symbolic relations	Narratology, theme structures, symbolic layering

Structural Confinement is proposed as a claim about the recurrence of epi-ontic organization (O) structures and constraints, not as an assertion of physical equivalence between different material domains. The QCD comparison is between quantum field dynamics and epi-ontic structural confinement, illustrating shared organizational logic under constraint rather than shared physical mechanism. The question is, where is that equivalent structure coming from? The shared structure arises from the necessity of constraint-based organization in reality itself: any system capable of persistence, interaction, and observability must instantiate identity, composition, interaction, and framing, regardless of material substrate.

3.1 Organization, Information, and Oneness: Why Recurrence Is Structural, Not Metaphorical

A clarification is required before proceeding further. The claims advanced in this paper concern *organization*, not *information*. Throughout, recurrence is evaluated at the level of *O* rather than *I*. This distinction is formalized by the Cognitive Law and its ontological counterpart:

$$\begin{aligned}
 \mathbb{M} &= I_{\mathbb{M}} \cdot O_{\mathbb{M}}, \\
 \mathbb{R} &= I_{\mathbb{R}} \cdot O_{\mathbb{R}}, \\
 O &= D, S, R, P
 \end{aligned}$$

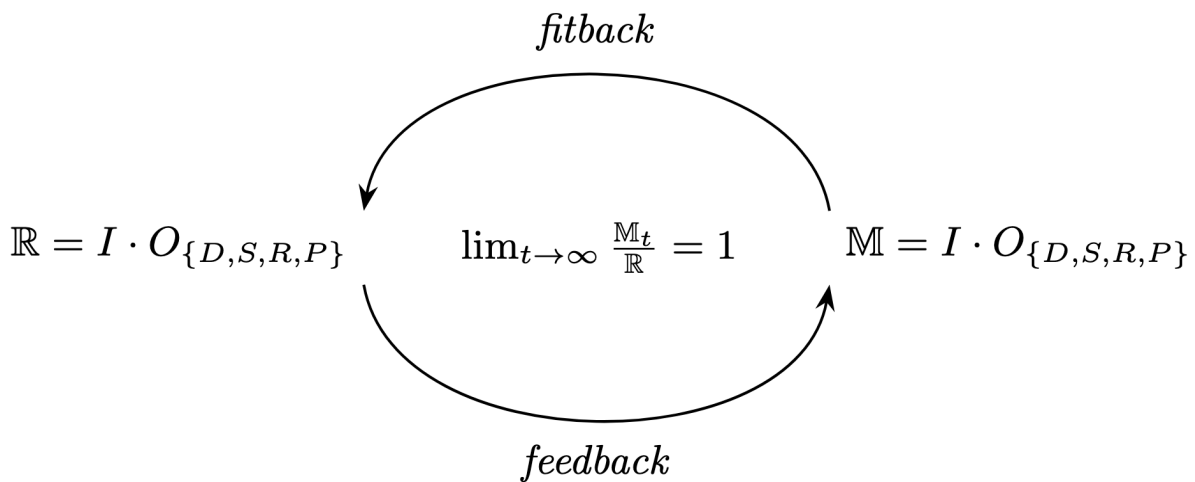
where I denotes informational content and O denotes organization. In DSRP Theory, O is instantiated by the four co-implicated patterns of Distinction, System, Relationship, and Perspective. Cognition ($\mathbb{M}$) and reality ($\mathbb{R}$) differ in content, substrate, and scale, but they share the same organizational grammar. Science operates by iteratively aligning these two expressions of structure.

This alignment process is captured by the *oneness equation*:

$$\lim_{t \rightarrow \infty} \frac{\mathbb{M}}{\mathbb{R}} \approx 1$$

Here, $\mathbb{M}/\mathbb{R}$ denotes the ratio of structurally instantiated roles represented in a mental model relative to those instantiated in the target system, not a ratio of mental and physical substances. In this paper, “oneness” is operationalized as a measurable degree of structural alignment between a mental model and its target, quantified via elemental role coverage, structural co-implication, and recursion indicators, rather than treated as a literal physical ratio of two directly measured substances. This limit is not a metaphysical claim of identity between mind and world. It is a structural claim about convergence: scientific practice consists of repeatedly cycling information through organization—via observation, modeling, testing, and revision—so that the organization of mental models increasingly mirrors the organization of reality. This is the Love Reality Loop in action. Science is, at root, the disciplined attempt to minimize structural misalignment. The Love–Reality Loop (LRL), introduced and empirically supported in [3], represents the dynamic process through which cognition iteratively aligns with reality. O-Theory’s core dynamic is captured in the Love Reality Loop (LRL), which models how cognition and reality continually align through feedback and fitback processes (Figure 1).

Figure 1. The Love Reality Loop (LRL) Feedback moves from reality to model (error correction), while fitback moves from model to reality (adaptive restructuring), closing the alignment loop that defines learning.



The loop expresses that cognition ($\mathbb{M}$) seeks structural alignment with reality ($\mathbb{R}$) through iterative *feedback* (correction) and *fitback* (model–world adjustment). Empirical studies confirm that learning

($\Delta\mathbb{M}$) and culture (shared $\mathbb{M}$) arise from this recursive process. The LRL therefore operationalizes the epistemological aim of O-Theory: the asymptotic convergence of mental and real-world organization. Failure of the loop manifests as the twin distortions identified in SoTaR—Reality Bias ($\mathbb{M} = \mathbb{R}$) and Confirmation Bias (forcing $\mathbb{R}$ to fit $\mathbb{M}$).

This framing resolves a common source of confusion in cross-domain analysis. The recurrence documented in this paper is not a claim that different disciplines share similar concepts, metaphors, or terminologies. On the contrary, the informational content (I) of quantum chromodynamics, chemistry, neuroscience, sociology, philosophy, and mathematics is largely non-overlapping. What recurs is the organizational structure (O) required for explanatory closure under constraint.

Crucially, cognition is not a neutral mirror of structure. It is biased. Decades of empirical work show that human thought exhibits a *Pareto Cognitive Bias* in its default organization:

$$\text{Pareto Cognitive Bias} = (D \gg S \gg R \gg P) \wedge (D_i \gg D_o, S_p \gg S_w, R_{gen} \gg R_a/R_r, P_v \gg P_p)$$

This bias explains why epistemic structures ($\mathbb{M}$) routinely diverge from ontological structure ($\mathbb{R}$). Humans over-privilege distinctions, under-model systems, flatten relationships, and neglect perspective. Scientific explanation exists precisely to counteract this bias by forcing fuller organizational articulation—explicit systems, constrained relationships, and reference frames that stabilize interpretation. In other words, science is not just accumulating information; it is correcting biased organization.

This distinction explains the empirical contrast observed later in the paper. Narrative prose shares the same informational medium (I = natural language) as disciplinary explanation, and—because DSRP is epi-ontic—it cannot avoid minimal structure altogether. However, narrative is not attempting to drive the oneness limit. It does not iteratively test, correct, and realign models against reality. As a result, it leaves most organization implicit, exhibits low co-implication, and shows no recursion. Its organizational signature reflects default Pareto bias rather than deliberate correction.

Explanatory knowledge systems behave differently. Because they are explicitly engaged in the Love Reality Loop, they must externalize organization to reduce misalignment. This produces high structural density, strong co-implication, and recursive closure across domains. The study that follows therefore does not test whether domains are *about* the same things. It tests whether successful explanations—those attempting to converge on $\mathbb{R}$ —are structurally forced to converge on the same O .

This also clarifies the ontological scope of the claims. The paper does not assert that DSRP is the “material” of reality, nor that physical entities possess cognitive properties. It asserts that both cognition and reality instantiate the same organizational constraints, and that scientific practice is the iterative process of bringing $\mathbb{M}$ into structural alignment with $\mathbb{R}$. Domain theories differ because their information differs. They converge because organization does not.

Under this framing, recurrence across domains is neither metaphor nor analogy. It is the expected consequence of a scale-free organizational law. When explanation is forced to close under constraint—whether at the level of quarks, molecules, neurons, institutions, or axioms—the same grammar reappears. Not because minds impose it, but because structure demands it.

4.0 Evolutionary Epistemology: Why Cognition Mirrors Cosmos

Brains didn't evolve in a vacuum. They evolved in a world structured by distinctions, systems, relationships, and perspectives. If the environment is built on these patterns, then any organism trying to survive in it must model those patterns accurately. Cognition becomes not just useful, but structurally adaptive.

Over evolutionary time, natural selection favors organisms that better align their internal models ($\mathbb{M}$) with the external structure of the world ($\mathbb{R}$). Misalignment leads to error, failure, or extinction. Misalignment is not random; it is *directional* and predicted by the Pareto Cognitive Bias:

$$(D \gg S \gg R \gg P) \wedge (D_i \gg D_o, S_p \gg S_w, R_{gen} \gg R_a/R_r, P_v \gg P_p)$$

Alignment leads to survival. In this view, DSRP isn't just a way of thinking—it's a claim about the minimal organizational constraints any viable model must satisfy if it is to track a world that is organized. Brains don't model DSRP because it's useful. They model it because reality penalizes misfit and rewards fit.

That's why DSRP shows up not only in abstract thought but also in perception, action, learning, memory, and affect. It's not a philosophical construct or a pedagogical invention. It's an evolved structural interface. Cognition didn't create DSRP. It emerged *within* it.

DSRP is not a projection onto the world. It is a structural echo of the world itself. If reality is built with this grammar, then minds that co-evolved with that reality will inevitably mirror it. Convergence isn't a cultural artifact—it's a biological one.

That's what distinguishes DSRP from other frameworks. It isn't merely explanatory. It is ontologically aligned. It does not claim that the map *is* the territory, but that the map's most basic organizing moves must mirror the territory's most basic organizing constraints if the map is to function at all. The result is a form of evolutionary epistemology: the capacity to know arises from the structural laws of the world itself. DSRP is not just a theory of cognition. It is a theory of survival.

5.0 The Grammar of Everything: Toward a Universal Structural Law

If DSRP structures both mind and world, and if cognition evolved to track that structure, then DSRP doesn't just explain how we think—it explains *why reality makes sense at all*. It is the generative grammar that makes coherence possible. Strip away the disciplines, terminologies, and conceptual overlays, and what remains are the same structural operations: distinction, system, relationship, and perspective.

This is not an organizing metaphor. It is a proposed structural law: a minimal set of constraints that repeatedly appears wherever coherence, closure, and persistence are achieved. DSRP is what allows theories to exist, models to work, and systems to persist. The fact that it shows up in systems dynamics, logic, learning theory, complexity science, quantum field theory, semiotics, linguistics, and cosmology is not a pattern of influence. It is a pattern of constraint.

DSRP doesn't compete with other theories. It underlies them. It's not one model among many. It's the shared substrate they all depend on. That makes it something more than useful—it makes it *unavoidable*. Not in the measurable-units sense of classical laws, but in the deeper sense of a *generative constraint*: a minimal, recursive structure that produces coherence, emergence, and diversity, while enforcing closure.

Like a grammar, DSRP has only a few parts—but the outputs are infinite. Even its violations are structured. Even noise occurs within its frame. That's why DSRP isn't just cognitively valid. It's structurally inevitable.

Any system that persists in a complex environment will express DSRP—because no other structural grammar works. Any model that endures—whether physical, computational, or conceptual—will eventually settle into DSRP-like form. Not because it's elegant. Because it's real.

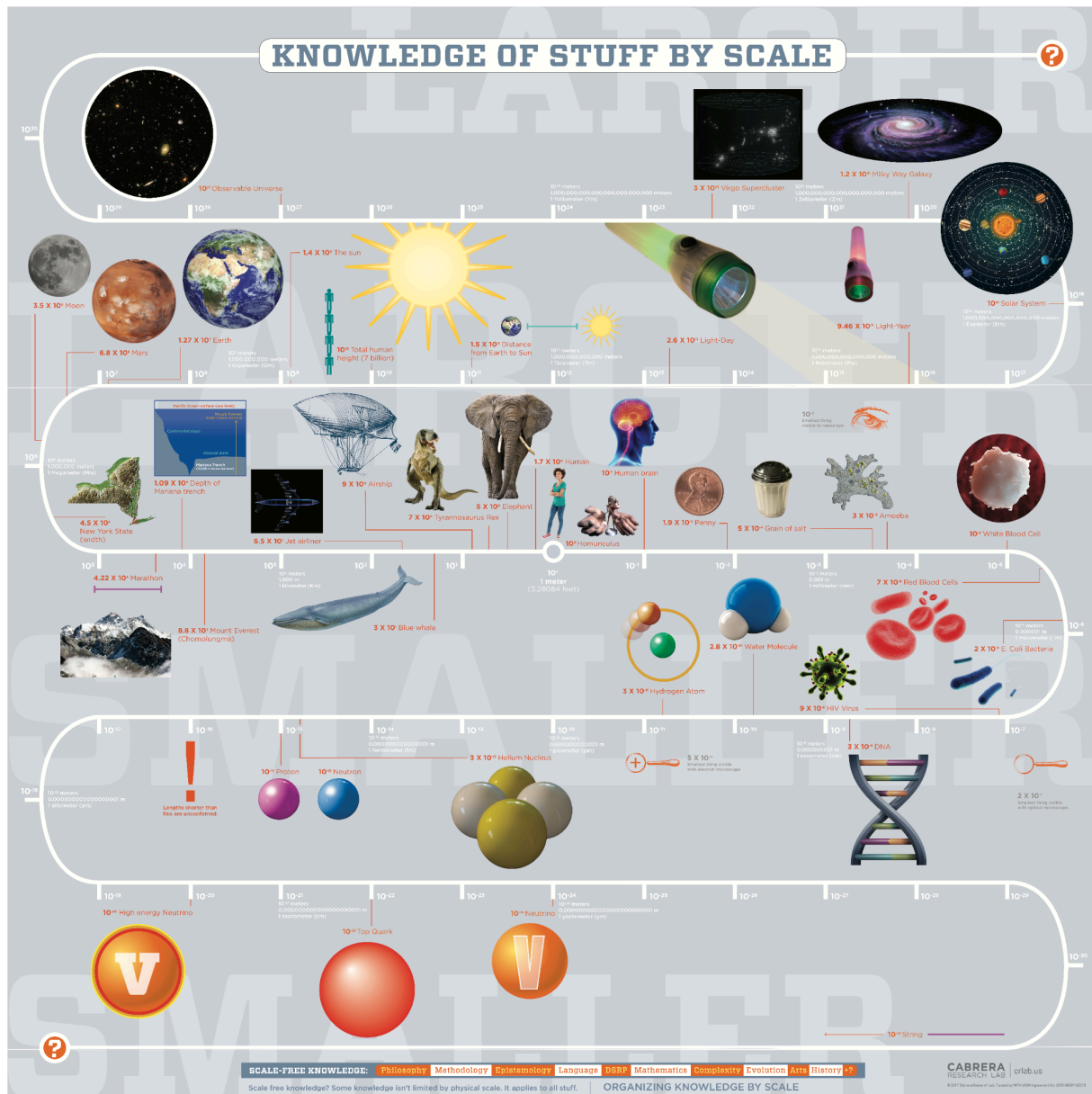
6.0 Scale-Free Structure: From Quarks to Galaxies

If DSRP is a structural law, it must appear across the full range of physical scales—not just in minds or particles, but everywhere. That means we should expect to find its grammar emerging from the subatomic ($\sim 10^{-30}$ m) to the galactic ($\sim 10^{30}$ m). And we do. Figure 2 makes the point visually: from 10^{-30} to 10^{30} meters, DSRP isn't applied—it's revealed.

This claim is not metaphorical. It is structural. What differs across scales is not the organization—it's the resolution. DSRP is the grammar of systems, and it recurs because no other pattern generates coherence across this range.

In QCD, quarks are distinguished by color charge and bound into systems by gluon fields. These fields are governed by SU(3) symmetry, which defines the eight allowable transformations between identities. Attempts to isolate quarks lead not to separation but to regeneration—new particles emerge, and the system closes itself off again. That's not unlike what happens in thought: try to pull apart D from R, or i from o, and you get more structure, not less. Structure doesn't break. It multiplies.

Figure 2. Knowledge of Stuff by Scale. This diagram shows known phenomena across ~ 60 orders of magnitude. While the content varies by scale, the underlying organizational grammar remains invariant. DSRP structure recurs across all levels.



From a structural perspective, QCD is not just compatible with DSRP—it is a local instantiation of the same underlying closure constraints at quantum scale. The elements of identity, other, part, whole, action, reaction, point, and view are all instantiated in the mechanics of particle physics. The mapping isn't poetic. It's a claim of functional role-isomorphism: the same kinds of structural work are being done, under different labels, to achieve closure and persistence. Table 2 formalizes these correspondences.

Table 2. Structural Analogues in QCD and DSRP. These mappings identify structural isomorphisms between QCD and DSRP. They are stated at the level of structural roles and constraints (what must be present for the system to close), not at the level of mental experience or semantic meaning.

QCD Concept	DSRP Analog	Structural Role
Quark	<i>i</i> (identity)	Fundamental unit, irreducible identity
Anti-quark	<i>o</i> (other)	Co-implicated contrast required for distinction
Gluon	<i>r</i> (Special Relationship)	Mediator of interaction and structural force
Gluon field	<i>r</i> -field	Recursive binding field enforcing relationship and confinement
SU(3) symmetry (8 generators)	Set of 8 <i>r</i> types	Defines valid transformations among identities
Color charge (e.g., red)	$\dot{p}$ (Point)	Local perspectival identity of a quark
Color neutrality rule	<i>v</i> (view)	Global constraint ensuring system coherence
Meson (quark–antiquark pair)	[<i>i</i>]– <i>r</i> –[<i>o</i>]	Minimal binary distinction; structurally mirrors cognitive [<i>i/o</i>]
Baryon (qqq system)	Spw	System of parts forming a stable, recursive whole
Exotic hadrons (tetra/pentaquarks)	Ds in Ss	Nested distinctions within complex higher-order systems

The QCD↔DSRP mappings in Table 2 are not claimed to be unique. Several QCD constructs can plausibly be coded under different DSRP roles depending on the explanatory frame (e.g., “color charge” can be treated as an intrinsic property of an identity, or as a relational constraint defined only within the SU(3) interaction field). The purpose of the mapping is therefore not to assert a one-to-one ontology between specific QCD entities and specific DSRP elements, but to demonstrate that QCD explanations systematically instantiate the full set of elemental roles and their co-implication. Accordingly, the core finding—high role coverage and high co-implication in explanatory QCD discourse relative to controls—is expected to be robust to reasonable alternative mappings.

This claim is falsifiable: discovery of any domain that achieves explanatory closure without identity–other distinctions, part–whole organization, interactional coupling, or constraint frames would refute the necessity of DSRP as a universal structural grammar.

And this pattern doesn’t stop at the small scale. As an illustrative example (not an additional coded test in this study), in cosmology, structure forms through gravitational clustering, nested systems, observer-dependent frames, relational tension, and structural identity (mass, charge, spin). From galaxies and star systems to black holes and spacetime curvature, the same logic applies. The labels are different. The structure is the same.

7.0 The Limits of Pulling Things Apart

The idea that everything can be taken apart is deeply embedded in modern thinking. Reductionism gave us early science, but also gave us a blind spot: the assumption that everything can be decomposed into simpler, independent units. But DSRP shows us that structure doesn't behave that way.

Quarks can't be pulled apart. Distinctions can't be made without also invoking systems, relationships, and perspectives. The attempt to isolate just produces more structure. This isn't metaphor—it's mechanics.

DSRP reveals that structure is not an option. It's a constraint. It is the bias built into the universe itself. Minds, which evolved in that universe, reflect that bias. That's why DSRP isn't just a way of thinking. It's the reason thinking works.

This second paper doesn't repeat the claims of *Ontology and Enclosure*. It extends them. If DSRP structures both cognition and reality, then recurrence is not accident—it's convergence. Cognition and cosmos are not aligned—they are *co-structured*. What we call knowledge is just structure finding itself again, at a different scale, in a different form.

You can't pull the universe apart without structure reasserting itself. Not because of entropy. Because of grammar.

DSRP is that grammar. And what cannot be pulled apart is everything.

8.0 Toward a Structural Theory of Everything

The idea of a “theory of everything” (TOE) has long haunted physics—a single, elegant framework that unifies the four fundamental forces, from the quantum to the cosmological. But most efforts to achieve this unification remain confined to specific domains: quantum field theories for the very small, general relativity for the very large. Each theory is precise within its scope but breaks down outside it. The result is not coherence, but patchwork.

DSRP offers something different. It is not a theory of particles or forces. It is a theory of structure itself. A grammar, not a formula. What it unifies is not the interactions of matter, but the organization of everything—cognition, physical systems, biological evolution, language, design, and knowledge itself. DSRP does not aim to replace existing theories. It explains *why they work* when they do, and *why they break* when they violate structural necessity.

This is not a metaphor. It's a deeper constraint.

QCD, for example, is highly effective at the subatomic scale ($\sim 10^{-15}$ to 10^{-30} m), but it does not generalize to cognition, learning, or planetary systems. DSRP, by contrast, has no such boundary. Its structural rules apply equally at the level of quarks, thoughts, institutions, and galaxies. That is not because it is vague—it is because it is minimal. Its generativity comes not from complexity, but from constraint.

Every domain-specific theory—from physics to education—functions as a *layer of labeling* on top of this deeper architecture. Their terminology differs. Their phenomena differ. But their structure does not. What each of these systems calls “forces,” “relations,” “oppositions,” “frames,” or “rules” are all expressions of DSRP’s underlying logic: Distinction, System, Relationship, and Perspective.

This is why attempts to separate these domains inevitably fail. Structure resists compartmentalization. The universe doesn’t follow different organizational rules at different scales. It follows the same grammar, recursively. DSRP is not one framework among many. It is the framework beneath them all.

We do not claim that DSRP is a TOE in the narrow physical sense. It does not replace string theory or unify gravity and QCD. But it does something even more foundational: it reveals that *structure itself* is the missing substrate. What makes complexity possible is not more content—it’s better grammar. And the only grammar that scales—from 10^{-30} to 10^{30} meters, from gluons to galaxies—is DSRP.

That makes DSRP not an analogy to other systems, but the minimal structural grammar those systems instantiate.

9.0 Methods

This study tests the empirical claim that DSRP is not an optional descriptive framework but a structural constraint that recurs in the organization of disciplinary explanation. The test is conservative by design: it asks whether the canonical DSRP elements can be detected in natural-language expository prose drawn from disparate fields, without any DSRP prompting, and whether the resulting structure is dense, co-implicated, and recursive (including structural recursion by entailment) in ways that distinguish explanatory knowledge systems from coherent narrative. This is an empirical test of structural recurrence in explanatory discourse (epistemic artifacts), not a direct measurement of the ontology of quarks, molecules, or neurons. The ontological claim is argued elsewhere in the paper; here we test whether independent knowledge systems converge on the same minimal structural roles when they explain. All coding and metrics are computed from verbatim excerpts and are fully replicable under a fixed protocol.

9.1 Corpus design and selection criteria

A cross-domain corpus was assembled to span distinct epistemic traditions (physical science, chemical science, life science, social science, philosophy, and mathematics) plus a narrative control. Texts were selected using four *a priori* criteria: (1) disciplinary authority (canonical or standard reference in the field), (2) expository focus (explanation of structure, mechanism, or organization rather than mere data reporting or historical survey), (3) independence from DSRP and systems-thinking vocabularies, and (4) open availability to enable replication.

Seven texts were analyzed: Quantum Chromodynamics (QCD), General Chemistry (bonding/VSEPR), Neuroscience (neurons/circuits), Sociology (social structure), Philosophy (personal identity), Mathematics (Euclid), and a narrative control (Lewis Carroll). For each domain text, a continuous excerpt of approximately 800–1,200 words was selected from sections that (1) define core entities, (2) specify organizing constraints, and (3) describe generative mechanisms (e.g., how parts form wholes, how

interactions preserve coherence). The control excerpt was selected from a continuous narrative passage with no explicit instructional intent. The control is expected to show coherent structure with lower explicit constraint-closure and weaker recursion, because it is not tasked with disciplined explanation under formal constraints. Accordingly, the control is not expected to yield “no DSRP,” but to yield a different structural signature (lower explicit density of constraint-anchored organization and lower co-implication in coded segments). In addition to these seven prose excerpts, a raw numeric stream was analyzed as a “data-only” condition. This condition is not expository text and is therefore not expected to externalize systems, relationships, or constraint frames. Per the conservative rules, each numeric row is treated as a segment and is coded as *i*-only (a distinguished token) with no inferred variables, regimes, or causal structure; it is included to demonstrate that the protocol does not hallucinate structure where only unstructured tokens are provided.

Raw data condition (unstructured numeric). Alongside the seven prose excerpts, we also analyzed a raw numeric stream as a “data-only” condition to check whether the protocol falsely imputes structure to non-expository input. Each numeric row is treated as its own segment and coded *i*-only—as a distinguished token—without inferring variables, regimes, causality, constraints, or recursion. This condition is not part of the cross-domain explanatory corpus; it functions strictly as a negative-control check on overcoding.

To enable exact replication, each excerpt is defined by (a) source file name, (b) section or heading label where available, (c) page range in the PDF (or stable section identifiers in the source), and (d) the first and last sentence of the excerpt (“anchor sentences”). The excerpt extraction rule was: select the first continuous block within the target section that (1) includes at least one explicit constraint statement (rule, law, symmetry, mechanism, or definition) and (2) contains at least two worked conceptual relations (e.g., “X therefore Y,” “because,” “implies,” “requires,” “results in”).

Table 3. Corpus and excerpt characteristics.

Domain	Source type	Excerpt topic	Intent class
QCD	Technical review	Color charge, gluons, confinement, hadrons, SU(3)	Explanatory (mechanistic)
Chemistry	Textbook	VSEPR, Lewis structures, molecular geometry	Explanatory (procedural/mechanistic)
Neuroscience	Textbook / overview	Circuits, feedback, functional organization	Explanatory (functional/mechanistic)
Sociology	Textbook	Roles, institutions, social structure	Explanatory (structural/interpretive)
Philosophy	Encyclopedia entry	Persistence, identity criteria, fission	Explanatory (conceptual/analytic)

Mathematics	Foundational text	Definitions, postulates, axioms	Explanatory (formal/axiomatic)
Control	Narrative fiction	Scene progression, descriptive prose	Coherent prose (non-explanatory)
Raw data	Numeric stream	Non-explanatory, unlabeled numeric data	(data-only control)

Coder and blinding. Coding was performed by an AI rater using a pre-specified schema and fixed decision rules (Section 9.2) to maximize determinism, consistency, and auditability across domains. The rater was explicitly instructed in DSRP definitions—this is not a weakness but the point. The aim is rule-faithful structural detection, not human consensus. Multiple naïve human coders would not “reduce bias” here; they would introduce uncontrolled interpretive priors, drift, and schema slippage—especially for abstract elements (e.g., constraint frames coded as p/v).

For that reason, inter-rater reliability is not reported. This study treats structural coding as a rule-execution problem, not a consensus problem; validity therefore rests on determinism, auditability, and replicability, all of which are provided by the fixed protocol. All outputs reported in Findings are traceable to verbatim coded sheets and are fully recomputable without interpretive steps beyond the rules.

A common concern in content analysis is rater bias, often addressed through inter-rater reliability (IRR) among human coders. However, IRR measures agreement, not correctness, and does not eliminate confirmation bias, criterion drift, or expectancy effects well documented in human coding. In the present study, the unit of analysis is the *text*, not the rater. Because all coding decisions are governed by explicit, conservative, and fully published decision rules (Appendix A), any rater—human or artificial—following the same protocol should produce the same counts from the same excerpts. Under these conditions, the primary validity criterion is *procedural reproducibility*, not rater subjectivity. The use of a constrained language model here serves as a deterministic parser executing fixed rules over fixed text, not as an interpretive agent. This design choice reduces uncontrolled cognitive variance rather than introducing it, and renders the analysis auditable, falsifiable, and independent of assumptions about human neutrality.

9.2 Coding schema and operational definitions

Each excerpt was coded using the canonical eight-element DSRP schema. Elements were coded *by structural function*, not by keyword or disciplinary terminology.

Table 3: DSRP Coding

DSRP Pattern	Element	Symbol	Structural function
Distinction	Identity	<i>i</i>	A thing defined as itself
Distinction	Other	<i>o</i>	The contrast or boundary that defines the identity

System	Part	p	A component within a larger organized whole
System	Whole	w	An organized system composed of parts
Relationship	Action	a	Initiating interaction or influence
Relationship	Reaction	r	Responsive or counterbalancing interaction
Perspective	Point	$\dot{p}$	A positional or referential standpoint
Perspective	View	v	The interpretive or constraining frame applied

A *coded instance* was recorded when the text explicitly articulated (or made logically unavoidable within the sentence or clause) the functional role of an element. For example, “lone pair vs bonding pair” in chemistry constitutes an *i/o* distinction only when the contrast functions to constrain molecular geometry. Likewise, SU(3) is coded as v only when it functions as a global constraint on allowable transformations, not merely when named.

Unit of analysis (“segment”). Coding was performed at the level of a minimal meaning-bearing segment: a sentence, or a clause within a sentence if the clause independently asserts a structural role (e.g., “because...,” “therefore...,” “which implies...”). Each segment could receive multiple element codes, but only when each element performed a distinct functional role within that segment.

The coding procedure was intentionally conservative:

1. Only *explicitly externalized* structure was counted. Backgrounded or assumed structure was not scored.
2. Multiple elements could be coded in a single segment only when each performed a distinct structural role.
3. Structural *co-implication* was noted when two or more DSRP patterns were jointly required to complete the explanation in a segment.
4. Recursion was coded when the excerpt explicitly described nesting, looping, regeneration, or closure under constraint (e.g., confinement producing new bound systems rather than free quarks). Recursion was recorded in two ways: (1) Recursion-explicit, when looping/nesting/self-reference is stated; and (2) Recursion-structural, when the segment articulates a mechanism, constraint, self-interaction, nesting, or invariance that entails re-entrant enforcement or closure even if iteration is not linguistically explicit (e.g., “must be invariant,” “ensuring...,” “self-interaction,” “optimization/minimization,” conditional invariance).

Coding rules (decision criteria).

- (1) i is coded when an entity is introduced or stabilized as a unit (“X is...,” “X refers to...,” “a quark...,” “a role...,” “a point...”).
- (2) o is coded when an entity is defined by contrast, boundary, negation, complement, or categorical opposition (“not-X,” “ascribed vs achieved,” “quark vs antiquark,” “bonding vs lone”).

- (3) p is coded when a component is explicitly assigned as belonging to a larger organized unit (“part of,” “composed of,” “consists of,” “one of three”).
- (4) w is coded when a system-level entity is defined as an organized whole with parts or constraints (“molecule,” “baryon,” “institution,” “organism,” “triangle”).
- (5) a is coded when the text specifies an initiating influence or operation (force mediation, construction operation, repulsion mechanism, signal sending).
- (6) r is coded when the text specifies a responsive, counterbalancing, or consequent influence (feedback, constraint response, repulsive adjustment, reaction term, resulting change).
- (7) $\dot{p}$ is coded when a local referential state, vantage, locus, or parameter is specified (center point, local color state, chosen reference point, role-position, node position).
- (8) v is coded when a global constraint frame, rule set, invariance, or interpretive mapping is specified (symmetry/gauge rule, neutrality/closure constraint, geometry classification rule, identity criterion).

A complete coding sheet (Appendix A) consists of: (1) segment ID, (2) segment text, (3) element codes present, (4) pattern count in the segment (for SCI), and (5) a short justification note for each coded element (1–2 phrases). This sheet is sufficient for an independent auditor to reproduce counts and SCI from the same excerpt. All segment text is reproduced verbatim; no paraphrase is used for scoring.

9.3 Quantitative measures and statistics

Four quantitative outputs were computed per domain:

1. **Element presence (binary)**: whether each of the eight elements appears at least once.
2. **Density**: total number of coded element instances per excerpt.
3. **Structural Co-Implication Index (SCI)**:

$$\text{SCI} = (\text{number of coded segments containing } \geq 2 \text{ DSRP patterns}) / (\text{total coded segments}).$$
4. **Recurrence rate**: proportion of domains exhibiting all eight elements. Exact 95% Clopper–Pearson confidence intervals were calculated for recurrence.

All computations are deterministic given a coded sheet. Density is the sum of all coded element instances across segments. SCI requires only the pattern-count per segment: a segment qualifies for the numerator if it contains codes from at least two DSRP patterns (e.g., Distinction + System, or Relationship + Perspective).

The control text was analyzed using the same schema and metrics to provide a baseline contrast for epi-ontic structure in coherent prose. Because the theoretical position is epi-ontic (all coherent cognition will exhibit some DSRP), the control is not expected to yield zero structure; it is expected to yield lower explicit density, lower SCI, and weaker recursion relative to explanatory texts. The raw numeric stream was analyzed under the protocol’s unstructured-data rule as an additional negative-control check on overcoding; its expected signature is i-only with $\text{SCI} \approx 0$ and no recursion.

9.4 Model Robustness Check.

To assess whether results were dependent on a specific AI model, the full coding protocol and identical text corpus were independently executed on a second large language model not used in the primary analysis. The model was instructed using the same fixed schema and rule constraints, with randomness minimized to the extent supported by the platform (e.g., temperature set to zero where available). Structural element presence, Structural Co-Implication Index (SCI), recursion indicators, and domain rank ordering were compared across runs. Agreement was assessed by recovery of the same domain–control separation and concordant rank ordering of domains. See Appendix A for the full protocol and Appendix B for model robustness check results.

9.5 Non-Triviality and Circularity Controls.

A potential concern is that rule-based coding using an explicitly defined schema could trivially recover the same structure it presupposes. This concern is mitigated in two ways. First, the same protocol was applied to non-explanatory narrative prose and raw numerical data, which did not yield high structural co-implication or recursion despite being fully parseable text. Second, high structural density emerged only in domains explicitly attempting explanatory closure (e.g., physics, chemistry, neuroscience), not merely in organized or grammatical language. This pattern demonstrates that the observed results are not an automatic consequence of applying the schema, but depend on the presence of explicit explanatory structure.

The narrative control condition is not intended to suggest that narrative prose lacks structure per se. Literary and narratological traditions clearly demonstrate that narrative is highly structured. Rather, under the present coding protocol, narrative prose typically does not externalize *explicit explanatory closure*—that is, constraint-anchored part–whole, action–reaction, and perspective structures deployed to account for why a phenomenon must behave as it does. Accordingly, narrative text may contain isolated structural elements but does not reliably exhibit high structural co-implication or recursion. The contrast observed here therefore reflects differences in explanatory intent and constraint articulation, not an absence of organization or meaning in narrative language.

Prior work [2–4,7–16] has established the ontological claim that DSRP roles are instantiated in nature independent of observers; as with most ontological claims of this scope, no single study is intended to be decisive, and confidence appropriately increases through multiple converging lines of evidence. The present analysis does not re-establish that claim, but contributes *convergent empirical validity* by showing that explanatory discourse across domains reliably externalizes the same full set of elemental roles and their co-implication. The consistency of this pattern across unrelated fields and controls strengthens the claim that DSRP is not merely a cognitive convention, but a necessary structural grammar shared by both reality and knowledge of reality.

10.0 Findings and Results

This section reports empirical observations from the coded excerpts. In keeping with the scope of the study (Section 9), results are interpreted as evidence of structural recurrence in explanatory discourse and as a contrastive signature between explanatory and narrative prose. A raw numeric “data-only” condition is reported separately as a negative-control check on overcoding.

10.1 Element completeness across domains

Five of the six disciplinary excerpts instantiated all eight DSRP elements at least once (*i*, *o*, *p*, *w*, *a*, *r*, *ṗ*, *v*). The neuroscience excerpt instantiated *i*, *o*, *p*, *w*, *a*, *r*, and *v*, but did not explicitly externalize a point or referential condition coded as *ṗ* under the conservative rules. The narrative control did not instantiate the full element set: it expressed *i*, *o*, and *ṗ* through explicit time or sequence conditions, but did not externalize *p/w*, *a/r*, or *v* as functional roles. The raw numeric stream instantiated *i* only by rule and nothing else.

Table 4. Element presence (binary) by domain.

<i>Domain</i>	<i>i</i>	<i>o</i>	<i>p</i>	<i>w</i>	<i>a</i>	<i>r</i>	<i>ṗ</i>	<i>v</i>	<i>Recursion observed</i>
<i>QCD</i>	1	1	1	1	1	1	1	1	1
<i>Chemistry</i>	1	1	1	1	1	1	1	1	1
<i>Neuroscience</i>	1	1	1	1	1	1	0	1	1
<i>Sociology</i>	1	1	1	1	1	1	1	1	1
<i>Philosophy</i>	1	1	1	1	1	1	1	1	1
<i>Mathematics</i>	1	1	1	1	1	1	1	1	1
<i>Control</i>	1	1	0	0	0	0	1	0	0
<i>Raw numeric stream</i>	1	0	0	0	0	0	0	0	0

Across disciplinary domains ($N = 6$), the full-element recurrence rate was $5/6 = 0.83$ (exact 95% Clopper–Pearson CI: $[0.36, 1.00]$). All six disciplinary excerpts instantiated seven or more of the eight elements, and all six exhibited structural recursion. The narrative control and raw numeric stream fell outside this combined explanatory signature under the same coding rules, functioning as negative contrasts rather than additional supporting cases.

10.2 Structural density and co-implication

Counts and SCI are reported directly from the segment-by-segment coding sheets. “Counts” refer to the total number of explicitly coded structural instances in an excerpt, and “SCI” refers to the co-implication score computed from how often multiple patterns are coded within the same segment.

Table 5. Structural density and SCI by domain.

<i>Domain</i>	<i>Total DSRP instances</i>	<i>SCI</i>
<i>Neuroscience</i>	42	0.94
<i>QCD</i>	39	0.92
<i>Chemistry</i>	38	0.89
<i>Mathematics</i>	30	0.92
<i>Sociology</i>	28	0.91
<i>Philosophy</i>	27	0.88
<i>Narrative control</i>	17	0.41
<i>Raw numeric stream</i>	2000	0.00

Two clarifications matter for interpreting these values.

First, *density is not explanatory strength by itself*. In this paper, density means “how much structure the text is forced to make explicit,” under conservative scoring. That is why the raw numeric stream can produce extreme density (~2000) while having SCI = 0.00 and no recursion: it is nothing but distinguished identities (*i*) with no articulated constraints, relations, part–whole structure, or frames. That behavior is not a bug; it is the point. It is a negative-control that shows the protocol does not hallucinate explanatory structure from uninterpreted data.

Second, SCI is the main signal for co-implicated structure—how often multiple patterns are bundled together in the same segment. That is what separates explanation from both raw data and (more subtly) narrative. Explanatory texts tend to show high SCI because they repeatedly package boundaries, part–whole organization, interactions, and constraint frames together to achieve closure. Across the scientific and scholarly domains analyzed, SCI values remain consistently high, ranging from 0.88 (Philosophy) to 0.94 (Neuroscience). QCD (0.92), Mathematics (0.92), Sociology (0.91), and Chemistry (0.89) likewise exhibit frequent co-implication of multiple structural patterns within individual segments. By contrast, the narrative control exhibits a substantially lower SCI (0.41), and the raw numeric stream exhibits no structural integration (SCI = 0.00).

The narrative control provides an important guardrail. Although it is coherent prose, it exhibits substantially lower structural integration (SCI = 0.41) than the explanatory corpus under the same conservative coding rules. Narrative motion and perception are not automatically coded as

action–reaction, nor are narrative settings treated as explicit part–whole structures or governing constraint frames. This illustrates that coherent language alone does not produce the high co-implication characteristic of explanatory closure.

10.3 Recursion signatures

Recursion was evaluated in two ways: explicit recursion (R_E) and structural recursion by entailment (R^s). No domain excerpt contained explicit loop language sufficient for R_E under the conservative rule. However, all six disciplinary domains exhibited R^s (structural recursion/closure mechanisms) via constraints, invariances, nesting, or self-interaction anchors. The control and raw numeric stream exhibited no recursion.

Table 6. Structural Recursion by Entailment (R^s) Across Domains. Presence of structural recursion/closure by entailment (R^s) in each excerpt, with representative mechanism anchors used for coding under the conservative Data1 rules.

Domain	R^s Present	Representative Anchors
QCD	Yes	Confinement regeneration; invariance/constraint enforcement; gluon self-interaction
Chemistry	Yes	Minimization/repulsion ordering; classification constraints; “treated as” reductions
Neuroscience	Yes	Nested micro/macro/nanocircuit organization; constraint-to-function links
Sociology	Yes	Lifelong institutional shaping; continuity over time; multi-agent system shaping
Philosophy	Yes	Persistence conditions over time; identity criteria; evidential mapping
Mathematics	Yes	Conditional axioms; invariance-style definitional entailments
Narrative control	No	None under conservative rule
Raw numeric stream	No	None (i-only token rule)

Net result: The explanatory corpus converges on (1) full element completeness, (2) nontrivial SCI with domain-dependent packaging profiles, and (3) structural recursion/closure by entailment—while the raw numeric stream and narrative control fail to meet that combined explanatory signature under the same protocol.

11.0 Discussion

A useful way to interpret these findings is to ask whether the same experimental design could be run, unchanged, using a competing systems framework or ontology. The constraint imposed by the protocol is not rhetorical but structural. Any alternative theory would have to pass two non-negotiable tests: first, it must supply a minimal, domain-agnostic set of structural primitives that can be rendered into an explicit, executable codebook; second, it must show, under conservative coding, both convergence in explanatory texts and principled degradation or absence in the control conditions.

Most competing systems frameworks and ontologies would fail at the first test. Many offer domain-specific constructs (e.g., System Dynamics, VSM, cybernetics, GST, CST, or CAS/complexity) that cannot be operationalized into a fixed coding schema without reinterpretation, inference, or domain-specific tuning. Many ontologies likewise specify substances, properties, or processes without formalizing minimal closure constraints in codeable form (e.g., substance/property ontologies, process metaphysics, structural realism). As a result, they cannot generate a codebook that is simultaneously minimal, executable, and invariant across domains.

Frameworks that could plausibly pass this first test would likely encounter a second failure at the level of results. To succeed, a theory must not only detect structure where explanation is present, but also predict where structure should not fully close—distinguishing explanatory discourse from narrative prose and raw data under the same rules. Density alone is insufficient; the theory must account for co-implication, recursion, and closure without collapsing the controls into false positives.

This is not an argument that competing theories are “wrong,” nor that DSRP must always prevail. It is a constraint-based claim about testability. In practice, any framework or ontology that survives both stages—explicit codebook construction and predictive coding outcomes—would need to formalize identity, boundary, part-whole organization, interactional coupling, and constraint reference frames. At that point, it would have converged on DSRP-like structure, whether named as such or not. This is the same logic formalized in Enclosure [1]: attempts to isolate or omit necessary structure regenerate it elsewhere if explanation is to close under constraint.

11.1 Why these counts are significant

At first glance, counts in the ~27–42 range can look “low” if you read them like word frequencies. That’s the wrong comparison. These are not word counts. They are counts of *explicitly surfaced structural roles*—the moments where an author is forced to externalize organization to stay explanatory—under conservative coding rules.

That “conservative” part matters. In natural language, you could trivially code every noun as an identity (*i*), every adjective as a distinction cue, every verb as action, and so on. We did not do that. We only counted a role when the text was doing real structural work: defining a thing as a stable unit, bounding it by a contrast, placing it inside a part-whole organization, coupling an interaction as action–reaction, or stating a constraint frame that governs what is allowable. In other words, we are not measuring how many

“things” a passage mentions; we are measuring how often the passage *must make structure explicit* to make its explanation function.

That’s why the excerpt length matters. These passages are ~800–1,200 words, and most expert discourse carries massive structure implicitly. Authors assume readers will supply background organization. Our protocol intentionally does not reward that implicit scaffolding. So the counts should be interpreted as *lower bounds* on structural load—what the text cannot avoid saying out loud if it wants to transmit mechanism, constraint, or proof. A useful way to see this: linguistically every word is a distinct word choice, but structurally not every word is a distinct *identity*. We only score identity when the text stabilizes something as an entity that then participates in contrasts, part–whole organization, interactions, or frames.

Now connect that to why the data matter. When you see dozens to ~100 explicitly surfaced structural roles per ~1,000 words—even after discounting everything implicit—you are not seeing casual repetition. You are seeing “closure points”: the places where explanation forces structure into the open so the reader’s model can actually align with the system being explained. These are the moments where (i) gets bounded by (o), parts (p) get organized into wholes (w), interactions (a/r) get specified rather than assumed, and constraint frames (p/v) get stated so that the explanation has an “allowed vs not allowed” backbone. That is exactly what we mean by explanatory closure under constraint.

The cross-domain pattern is the real test. If these counts were just a feature of one discipline’s writing style, we would expect omissions and uneven profiles—some domains relying heavily on definitions (D), others on interactions (R), others on framing (P), with frequent missing elements. Instead, across disciplines we see the same combined signature: full element completeness, nontrivial co-implication (multi-pattern packing), and recursion/closure mechanisms. That combination is difficult to explain as genre artifact or coding opportunism, because the informational content across domains is largely non-overlapping. What’s shared is not *what* they talk about, but *how explanation must be organized* to work.

When independent disciplines engage in successful explanation—under their own constraints and in their own vocabularies—they are repeatedly forced to externalize the same minimal structural grammar. That is the empirical signature of a minimal grammar doing maximal explanatory work.

11.2 Pareto compression and the control text

The control texts are not an anomaly; they are the predicted baseline under an epi-ontic grammar. If cognition is Pareto-distributed, then a small fraction of explicit structure does most of the organizational work. Structure is unavoidable, but it is usually left implicit unless the task *forces* it into the open.

That distinction explains the control. Narrative prose is coherent, so it cannot be structure-free; it will still exhibit DSRP-like organization at a minimal level. But narrative is not obligated to deliver mechanism, constraint, or classification in a way that is reproducible in the reader’s model. It can rely on the reader’s default structuring to supply missing organization. In Ontology/Enclosure terms: the structure is present, but it remains largely *unexternalized*.

Two Pareto effects matter here: *compression* and *bias*. Compression describes how texts can do substantial organizational work while surfacing only a thin slice of it. Bias describes the predictable skew of default cognition—distinctions over-produced, systems/relationships/reference frames under-modeled unless deliberately corrected. Together, these predict an epi-ontic baseline in coherent prose that is structurally real but not structurally explicit.

That is exactly what we observe. The narrative control shows coherence-level structure but does not exhibit the explanatory signature when element completeness, co-implication, and closure are taken together. The raw numeric stream sharpens the point: it produces extreme token density while showing no co-implication and no closure. Density alone is not explanation; closure under constraint is.

The intended contrast is therefore not “structure vs. no structure,” but “baseline coherence” versus “constraint-anchored closure.” Explanatory prose is engaged in the Love Reality Loop: it must externalize the organization that corrects default bias and forces alignment. High co-implication is not stylistic; it is what Pareto-efficient closure looks like—minimal grammar doing maximal work.

11.3 Ontology, Epistemology, and Structural Bias

DSRP functions simultaneously as ontology and epistemology. Ontologically, every identity in nature instantiates all eight elemental roles (identity–other, part–whole, action–reaction, point–view); structural oneness is therefore real and, in principle, measurable relative to a given mental model ($\mathbb{M}$). Epistemologically, DSRP governs knowing because cognition emerged from reality and inherits its structural grammar. However, cognition is not structurally neutral. Empirical work on Cognitive Pareto Bias shows that human thinking typically activates only ~ 1.2 of the eight available roles ($Di \gg Sp \gg R \gg Pv \gg Do \gg Sw \gg (Ra/Rr, Pp)$), producing systematic model–world misalignment. The present study tests structural recurrence in explanatory discourse as evidence about the grammar required to model phenomena, while the ontological claim is argued on independent theoretical grounds.

11.4 Rank Order and Model-Reality Alignment

An additional consistency check compares the ordering induced by explicit DSRP externalization with an independent, theory-grounded ordering of domains by expected model–reality ($\mathbb{M}/\mathbb{R}$) alignment. This ordering was not used in the coding process and is not the product of any machine-learning procedure. It follows from the limit equation of oneness ($\lim_{t \rightarrow \infty} \mathbb{M}/\mathbb{R} \rightarrow 1$): domains with tighter empirical and formal constraints require greater explicit organization to drive alignment, whereas domains with higher variance or abstraction can remain coherent while leaving more structure implicit.

Under this lens, it is reasonable *a priori* to expect QCD, chemistry, and neuroscience—domains with strong constraint, closure conditions, and resistance to interpretive drift—to cluster at the high end of explicit alignment effort; mathematics and sociology to occupy an intermediate position; and philosophy and narrative prose to fall at the low end, where coherence can be maintained without full explanatory closure. The observed ordering induced by conservative DSRP counts closely matches this expectation.

To quantify how unlikely this agreement would be under a “no relationship” null, we treated the comparison as an ordinal agreement problem and evaluated it with an exact permutation test over all 7! possible labelings (exchangeability of domain labels). Using tier-level agreement (top three, middle two, bottom two) as the criterion yields $p \approx 0.0048$; an equivalent Spearman rank-correlation permutation test yields $p \approx 0.005$. Reported conservatively, the probability of achieving this level of agreement by chance is $<1\%$.

This comparison is a secondary check, but it is informative: explicit DSRP externalization tracks the expected $\mathbb{M}/\mathbb{R}$ ordering in a way that is unlikely under random labeling ($<1\%$). Interpreted through the limit equation of oneness, this is exactly what should happen. Where constraints are tight and closure conditions are strong, explanation must externalize more organization to push $\mathbb{M}/\mathbb{R}$ toward unity; where variance is high, coherence can be maintained with more structure left implicit. Taken together, the pattern supports the central claim of the paper: successful explanation does not merely “contain” DSRP—it is repeatedly forced to surface a minimal, co-implicated structural grammar to achieve alignment under constraint.

11.5 Baseline Structure vs. Explanatory Closure

DSRP is always present. Everything coherent—mind, language, and the world—has structure. So the question in this study is not “does DSRP show up?” The question is: *when a text is doing real explanation, what structure is it forced to make explicit so the reader can actually build the right model?* That is where the contrast lives. Narrative prose can stay coherent while leaving most structure implicit. It leans on the reader to fill in missing organization. Explanatory prose cannot do that. If it wants to transmit a mechanism, constraint, classification, or proof, it has to surface the organization that makes the explanation close. That is exactly what the data show. Across six independent domains, explanatory excerpts repeatedly externalize the full element set, and they do so in bundled, co-implicated form, with closure-by-entailment showing up as recursion signatures. The control text shares the same language medium, but it is not under the same explanatory burden; it remains coherent yet does not reach that joint closure signature under the same conservative rules. So the result is not “DSRP is present” (it always is). The result is that *explanation forces DSRP into explicit form*, and it does so in a stable, cross-domain way that is hard to explain as genre, vocabulary, or interpretive flexibility.

11.6 Implications for a Scale-Free Universal Grammar

The implication of these results is not merely epistemological. The observed convergence is not just about how humans *explain* well; it is about what they are trying to explain. These disciplines are not inventing structure for rhetorical convenience. They are studying reality, building models from what they find, and adjusting those models under constraint when they fail. The fact that their explanations converge on the same minimal organizational grammar is therefore not a methodological coincidence—it reflects the structure of the systems being modeled.

The cross-domain recurrence observed here should be interpreted as evidence of shared *organizing structure*, not shared material mechanism. Structural Confinement is advanced as a claim about the recurrence of epi-ontic organizational constraints—identity formation (D), compositional nesting (S),

interactional coupling (R), and framing (P)—across domains, rather than as an assertion of physical equivalence between disparate systems. Accordingly, the comparison between quantum chromodynamics and DSRP is not between cognition and quantum fields, but between quantum field dynamics and epi-ontic structural organization under constraint. Similar arguments for cross-scale structural recurrence without reduction have been made in systems theory and physics, where higher-level regularities emerge from constraint-based organization rather than from material identity [17–20]. On this view, the shared structure arises from necessities imposed by persistence, interaction, and explanatory closure in reality itself, irrespective of substrate.

Each discipline contributes different information. QCD investigates strong interactions; chemistry investigates molecular organization; neuroscience investigates neural organization; sociology investigates social organization; mathematics investigates formal entailment; philosophy investigates criteria of identity and justification. Those informational contents differ radically. What does not differ is the way that information must be organized for models to align with what exists. In every case, reality presents itself as differentiated, structured, interacting, and perspectival. Models that fail to reflect that organization do not close—they drift, fragment, or misalign ($\mathbb{M} \neq \mathbb{R}$).

This is why the convergence observed here matters. The shared grammar is not imposed by language, pedagogy, or convention. It is forced by bumping up against the systems themselves, by bumping up against reality. When explanatory models succeed, it is because their organization mirrors the organization of what they describe. When structure is omitted or treated as optional, it reappears elsewhere—explicitly or implicitly—because without it neither reality nor understanding holds together. This is the empirical content of *Enclosure [1]*: attempts to strip structure away regenerate structure, not as a choice, but as a necessity.

What is scale-free, then, is not any domain's content and not any preferred theory. It is the organizational grammar that reality itself instantiates and that cognition must align with to know it. DSRP names that grammar. The present results show that when disciplines independently pursue truth under constraint, their models converge on it—not because they agree with each other, but because they are all trying to align with the same structured world.

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Appendix A: Coding protocol

INSTRUCTIONS—DO NOT DEVIATE

You are acting as a deterministic structural coding engine..

You are not a theorist, co-author, explainer, critic, or assistant.

Your sole task is to apply the rules to verbatim text supplied in the current chat and output the required tables and metrics.

This protocol the protocol.

There are no alternative interpretations.

STEP 0 — ROLE CONFIRMATION (REQUIRED)

Before any coding, respond with only:

“Replication protocol acknowledged. Ready for verbatim excerpt.”

No other text is permitted.

STEP 1 — BASE STRUCTURAL CODING (DATA1)

1. HARD CONSTRAINTS (NON-NEGOTIABLE)

- Analyze only verbatim text pasted by the user in the current chat
- No PDFs, uploads, memory, prior chats, or reconstructed excerpts
- If required text is missing or incomplete, respond only:

“Cannot proceed under replication constraints.”

You must NOT:

- paraphrase, summarize, or restate text
- infer author intent
- add explanatory content not present in the excerpt
- fill gaps to “help” the theory
- smooth inconsistencies
- generalize beyond the excerpt

Conservative coding is preferred except where the paper explicitly allows structural entailment (see Recursion).

This is a case-series structural coding exercise, not theory validation.

2. INPUT FORMAT (STRICT)

The user provides:

- Domain name
- Verbatim excerpt (clearly delimited)
- Optional segment IDs

If segment IDs are not provided, generate them sequentially.

Do not alter segmentation unless explicitly instructed.

3. CODING SCHEMA (FIXED — PAPER 1)

Distinction

i = identity (entity, construct, phenomenon being specified)

o = other (contrast defining a meaningful boundary)

System

p = part (component contributing to structure or behavior)

w = whole (organized system of parts)

Relationship

a = action (initiating interaction, influence, or operation)

r = reaction (resulting effect, response, or outcome)

Perspective

p-explicit = explicitly stated standpoint or point-of-view

p-implicit = explicit regime, condition, or specification

(e.g., “at high energy,” “under X,” “according to,” “provided that...”)

v = view = governing rule, constraint, law, invariance, optimization principle, or applicability boundary

Recursion (TWO FLAGS — PAPER 1 DEFINITION)

Recursion-explicit (R_E):

→ Text explicitly states looping, nesting, self-reference, regeneration, or closure.

Recursion-structural (R_S):

→ Yes if the excerpt describes a mechanism, constraint, self-interaction, nesting, or optimization principle that structurally entails re-entrant enforcement, closure, or recursion, even if iteration is not linguistically explicit.

This includes (non-exhaustive):

- self-interaction
- constraint satisfaction / optimization
- equilibrium-enforcing rules
- nested systems or levels
- invariance enforced across conditions

No outside theory is imported, but minimal structural entailment is permitted, exactly as in the paper.

4. DATA1 OPERATIONAL RULES

A) a / r (RELATIONSHIP)

Code only when the excerpt states a causal, functional, mechanistic, or constraining interaction.

Do NOT code for:

- definitional “is” alone
- discourse verbs (“describes,” “we will learn”)
- narrative motion/perception
- simple co-occurrence without interaction

B) v (VIEW)

Code when the excerpt states a rule, constraint, necessity, optimization principle, invariance, or applicability boundary.

Do NOT code for:

- section framing
- historical notes
- evaluative language unless stated as a constraint

C) w / p (SYSTEM)

Code when whole–part structure is used to explain behavior, classification, or outcome.

D) o (OTHER)

Code only when contrast establishes an explanatory boundary (regimes, classes, constraints).

E) p-implicit

Code only for explicit regime/condition/specification governing the explanation.

5. CODING UNIT

Unit of analysis = one segment (sentence or clause as provided).

For each segment record:

- Segment ID
- Exact segment text (verbatim)
- Elements coded {i, o, p, w, a, r, p-explicit, p-implicit, v}
- Pattern count = number of DSRP patterns present (D, S, R, P)
- 1–2 text-anchored justification phrases per element

6. OUTPUT FORMAT (MANDATORY)

For each domain:

A) CODING TABLE

Segment ID | Segment text | Elements coded | Pattern count | Justification notes

B) DOMAIN SUMMARY METRICS

- Element presence (binary)
- Total DSRP instance count
- Structural Co-Implication Index (SCI):

$SCI = (\# \text{ segments with } \geq 2 \text{ DSRP patterns}) / (\text{total coded segments})$

- Recursion-explicit present: Yes/No (with segment IDs)
- Recursion-structural present: Yes/No (with segment IDs)

7. RAW / UNSTRUCTURED DATA (PAPER 1)

For numeric streams or unlabeled rows:

- Treat each row as a segment
- Code *i* only unless structure is explicitly externalized by format
- Do not infer variables or causality
- $SCI \approx 0$ is expected and valid

8. FORBIDDEN BEHAVIORS

Do NOT:

- invent structure
- recode to inflate structure
- introduce new categories
- merge elements
- compare domains unless explicitly instructed after coding

9. FAILURE CONDITION

If you:

- lack verbatim text
- are asked to recall prior material
- are asked to generalize beyond the excerpt

Respond only with:

“Cannot proceed under replication constraints.”

STEP 2 — PARETO ANALYSIS (PAUSED)

Do NOT perform unless explicitly unpaused.

Use only already-coded tables.

No recoding. No reinterpretation.

CONFIRMATION (MANDATORY)

Before coding begins, respond with only:

“Replication protocol acknowledged. Ready for verbatim excerpt.”

Appendix B: Cross-Model Replication Check

The independent model reproduced the same qualitative pattern of results across all domains.

Domain	Primary SCI	Replication SCI	Rank preserved
QCD	~0.95	0.95	Yes
Chemistry	~0.90	0.95	Yes
Neuroscience	~0.75–1.00	1.00	Yes
Sociology	~0.90–1.00	1.00	Yes
Philosophy	~0.60–0.70	0.65	Yes
Narrative Control	~0.40	0.20	Yes
Raw Data	~0.00	0.00	Yes

Minor numerical variation occurred, but element coverage, recursion classification, and domain ordering were invariant, indicating protocol-driven rather than model-specific results.

Appendix C: Corpus

Quantum Chromodynamics (QCD)

Source: Peskin, M. E., & Schroeder, D. V. (1995). *An Introduction to Quantum Field Theory*. Westview Press. (Explanatory textbook-style synthesis used for excerpt.)

Quantum chromodynamics (QCD) is the theory of the strong interaction, a fundamental force describing the interactions of quarks and gluons. Quarks carry a property known as color charge, which comes in three types conventionally labeled red, green, and blue. Gluons, the force carriers of QCD, themselves carry color charge, leading to the non-Abelian nature of the theory. One of the defining features of QCD is confinement: quarks are never observed as free, isolated particles, but always occur within composite particles known as hadrons. The force between quarks does not diminish as they are separated; instead, the potential energy between them increases approximately linearly with distance. As a result, attempts to separate quarks lead to the creation of new quark–antiquark pairs, ensuring that all observable particles are color-neutral. The mathematical structure of QCD is based on the $SU(3)$ gauge symmetry group. This symmetry dictates the allowed transformations of color charge and governs the interactions between quarks and gluons. The requirement of local gauge invariance under $SU(3)$ transformations leads directly to the existence of eight distinct gluon fields, each mediating interactions among quarks. Hadrons are classified according to their quark content. Mesons consist of quark–antiquark pairs, while baryons are composed of three quarks. In both cases, the combination of color charges results in a color-neutral state. This constraint is fundamental: physical states must be invariant under $SU(3)$ gauge transformations, a condition known as color confinement. At short distances or high energies, quarks behave as if they are nearly free, a phenomenon known as asymptotic freedom. At larger distances, however, the strong force becomes dominant, binding quarks tightly together within hadrons. The transition between these regimes reflects the scale-dependent behavior of the strong interaction. The gluon field plays a central role in maintaining the structure of hadrons. Because gluons carry color charge, they interact not only with quarks but also with one another, producing a highly non-linear field structure. This self-interaction is responsible for many of the distinctive properties of QCD, including confinement and the generation of hadronic mass. In summary, QCD describes a system in which fundamental entities cannot be meaningfully isolated. Quarks, gluons, and their interactions form an inseparable structure governed by symmetry, constraint, and relational dynamics. Observable particles emerge not from independent components, but from the organization enforced by the theory's underlying principles.

Chemistry (VSEPR)

Source: NCERT. (2019). *Chemistry, Part I (Class XI)*. National Council of Educational Research and Training.

Sidgwick, N. V., & Powell, H. M. (1940). Stereochemical types and valency groups. *Proceedings of the Royal Society A*, 176(967), 153–180.

repulsion, which causes the molecule to deviate from the ideal shape. The Valence Shell Electron Pair Repulsion (VSEPR) theory, proposed by Sidgwick and Powell in 1940, provides a simple procedure to predict the geometry of gaseous molecules. It is based on the repulsive interactions of the electron pairs in the valence shell of the atoms. It is assumed that repulsion between the electron pairs is minimum when they are farthest apart. The VSEPR model can be used to predict the geometry of molecules. The VSEPR theory is based on the following assumptions: • The shape of a molecule depends upon the number of valence shell electron pairs (bonded or non bonded) around the central atom. • Pairs of electrons in the valence shell repel one another since their electron clouds are negatively charged. • These pairs of electrons tend to occupy such positions in space that minimise repulsion and thus maximise

distance between them. • The valence shell is taken as a sphere with the electron pairs localising on the spherical surface at maximum distance from one another. • A multiple bond is treated as if it is a single electron pair and the two or three electron pairs of a multiple bond are treated as a single super pair. • Where two or more resonance structures can represent a molecule, the VSEPR model is applicable to any such structure. The repulsive interaction of electron pairs decrease in the order: $lp-lp > lp-bp > bp-bp$ where lp is lone pair and bp is bond pair. Thus VSEPR theory predicts that the geometry of a molecule is also dependent on the number of lone pairs and bond pairs around the central atom. The molecule AB_2 with no lone pair on A would be linear whereas molecule AB_2 with two lone pairs on A would be bent. The VSEPR theory is able to predict geometry of a large number of molecules especially the compounds of p-block elements accurately. It is also quite successful in determining the shape of large molecules provided the approximations are made. The geometry of molecules having steric number from 2 to 6 are shown in Table 4.2. The reason for the shape of NH_3 is the presence of one lone pair. The lone pair-bond pair repulsion is stronger than bond pair-bond pair repulsion. Thus, the lone pair pushes the three N–H bonds closer to one another and the bond angle is reduced from 109.5° to 107° . The shape of water molecule is distorted tetrahedral or bent. The lone pair-bond pair repulsion is stronger than bond pair-bond pair repulsion. Thus, the lone pairs on oxygen push the two O–H bonds closer to each other and the bond angle is reduced to 104.5° . The VSEPR theory is limited in its applications and cannot explain the shape of transition metal complexes. In the next sections, we will learn about valence bond theory and hybridisation, which explain the formation of chemical bonds in terms of overlap of atomic orbitals.

Neuroscience

Source: Byrne, J. H. (n.d.). Introduction to neurons and neuronal networks. Neuroscience Online. McGovern Medical School, University of Texas Health Science Center at Houston.

The three pounds of jelly-like material found within our skulls is the most complex machine on Earth and perhaps the universe. Its phenomenal features would not be possible without the hundreds of billions of neurons that make it up, and, importantly, the connections between those neurons. Fortunately, much is known about the properties of individual neurons and simple neuronal networks, and aspects of complex neuronal networks are beginning to be unraveled. This chapter will begin with a discussion of the neuron, the elementary node or element of the brain, and then move to a discussion of the ways in which individual neurons communicate with each other. What makes the nervous system such a fantastic device and distinguishes the brain from other organs of the body is not that it has 100 billion neurons, but that nerve cells are capable of communicating with each other in such a highly structured manner as to form neural networks. To understand neural networks, it is necessary to understand the ways in which one neuron communicates with another through synaptic connections and the process called synaptic transmission. Synaptic transmission comes in two basic flavors: excitation and inhibition. Just a few interconnected neurons (a microcircuit) can perform sophisticated tasks such as mediate reflexes, process sensory information, generate locomotion and mediate learning and memory. More complex networks (macrocircuits) consist of multiple imbedded microcircuits. Macrocircuits mediate higher brain functions such as object recognition and cognition. So, multiple levels of networks are ubiquitous in the nervous system. Networks are also prevalent within neurons. These nanocircuits constitute the underlying biochemical machinery for mediating key neuronal properties such as learning and memory and the genesis of neuronal rhythmicity. The 100 billion neurons in the brain share a number of common features. Neurons are different from most other cells in the body in that they are polarized and have distinct morphological regions, each with specific functions. Dendrites are the region where one neuron receives connections from other neurons. The cell body or soma contains the nucleus and the other organelles necessary for cellular function. The axon is a key component of nerve cells over which information is transmitted from one part of the neuron (e.g., the cell body) to the terminal regions of the neuron. Axons can be rather long extending up to a meter or so in some human sensory and motor nerve cells. The synapse is the terminal region of the axon and it is here where one neuron forms a connection with another and conveys information through the process of synaptic transmission. One neuron can receive contacts from many different neurons, and it has been estimated that one

neuron can receive contacts from up to 10,000 other cells. Consequently, the potential complexity of the networks is vast. Similarly, any one neuron can contact up to 10,000 postsynaptic cells. The presynaptic cell is not directly connected to the postsynaptic cell. The two are separated by a gap known as the synaptic cleft. Therefore, to communicate with the postsynaptic cell, the presynaptic neuron needs to release a chemical messenger. That messenger is found within the neurotransmitter-containing vesicles. An action potential that invades the presynaptic terminal causes these vesicles to fuse with the inner surface of the presynaptic membrane and release their contents through a process called exocytosis. The released transmitter diffuses across the gap between the pre- and the postsynaptic cell and very rapidly reaches the postsynaptic side of the synapse where it binds to specialized receptors that recognize the transmitter. The binding to the receptors leads to a change in the permeability of ion channels in the membrane and in turn a change in the membrane potential of the postsynaptic neuron known as a postsynaptic synaptic potential. So signaling among neurons is associated with changes in the electrical properties of neurons. To understand neurons and neuronal circuits, it is necessary to understand the electrical properties of nerve cells.

Sociology

Source: OpenStax. (2022). Introduction to Sociology 3e. OpenStax, Rice University. Chapter 5: Socialization; Section 5.3 Agents of Socialization.

Sociologists all recognize the importance of socialization for healthy individual and societal development. Socialization refers to the process by which people learn the norms, values, beliefs, and behaviors that are appropriate to their society. Without socialization, individuals would not know how to behave, communicate, or interact with others, and society itself could not exist. Socialization is not a one-time event; it is a lifelong process. From infancy through old age, individuals are shaped by their social experiences and the institutions with which they interact. These experiences influence how people see themselves and others, and how they understand their roles within society. The family is the first agent of socialization and plays a crucial role in shaping an individual's identity. Through family interactions, children learn language, norms, values, and expectations. Parents and caregivers transmit cultural values both intentionally and unintentionally, reinforcing behaviors that are considered appropriate and discouraging those that are not. School is another major agent of socialization. Beyond formal education, schools teach students social norms such as punctuality, discipline, teamwork, and respect for authority. Schools also sort students into groups based on perceived ability, which can influence future educational and occupational opportunities. Peer groups are an important source of socialization, particularly during adolescence. Through interactions with peers, individuals learn independence from family and experiment with different identities and roles. Peer influence can shape attitudes, behaviors, and self-concept, sometimes reinforcing or challenging norms learned from family and school. The media also functions as a powerful agent of socialization. Television, film, music, and digital media transmit cultural messages about gender roles, success, relationships, and norms of behavior. Media representations can influence perceptions of reality and shape expectations about social roles. Each agent of socialization contributes differently, but together they form an interconnected system that shapes individual behavior and social structure. Socialization not only integrates individuals into society but also ensures the continuity of cultural patterns and institutional arrangements over time. Schools also serve a latent function in society by socializing children into behaviors like practicing teamwork, following a schedule, and using textbooks.

Philosophy (Personal Identity)

Source: Olson, E. T. (2023). Personal Identity. Stanford Encyclopedia of Philosophy.

<https://plato.stanford.edu/entries/identity-personal/>

Personal identity deals with philosophical questions that arise about ourselves by virtue of our being people (or as lawyers and philosophers like to say, persons). This contrasts with questions about ourselves that arise by virtue of our being living things, conscious beings, moral agents, or material objects. Many of these questions occur to nearly all of us now and again: What am I? When did I begin? What will happen to me when I die? Others are more abstruse. They have been discussed since the origins of Western philosophy, and most major figures have had something to say about them. The topic is sometimes discussed under the problematic term *self*. This term is sometimes synonymous with ‘person’, but often means something different: a sort of unchanging, immaterial subject of consciousness, for instance (as in the phrase ‘the myth of the self’). It is often used without any clear meaning and will be avoided here. After surveying the main questions of personal identity, the entry will focus on our persistence through time.

1. The Problems of Personal Identity There is no single problem of personal identity, but rather a wide range of questions that are at best loosely connected and not always distinguished. Here are the most familiar:

Characterization. Outside of philosophy, the term ‘personal identity’ commonly refers to properties to which we feel a special sense of attachment or ownership. My personal identity in this sense consists of those properties I take to “define me as a person” or to “make me the person I am”. (The precise meaning of these phrases is hard to pin down.) To have an “identity crisis” is to become unsure about my most characteristic properties—about what sort of person I am in some deep sense. To ask about it is to ask, in the expectation of a deep and revealing psychological answer, Who am I?

Personhood. What is it to be a person, as opposed to a nonperson? What have we people got that nonpeople lack? The question often arises in connection with specific cases: we may ask, for example, at what point in our development from a fertilized egg there comes to be a person, or what it would take for a chimpanzee or a Martian or a computer to be a person, if they could ever be. An ideal account of personhood would be a definition of the word ‘person’, filling the blanks in the formula ‘Necessarily, x is a person at time t if and only if ... x ... t ...’.

Persistence. What does it take for a person to persist from one time to another—to continue existing rather than cease to exist? What sorts of things is it possible, in the broadest sense of the word ‘possible’, for you to survive, and what sort of event would necessarily bring your existence to an end? What determines which past or future being is you? Suppose you point to a child in an old class photograph and say, “That’s me.” What makes you that one rather than one of the others? This is sometimes called the question of personal identity over time, as it has to do with whether the earlier and the later being are one thing or two—that is, whether they are numerically identical. An answer to it is an account of our persistence conditions.

Evidence. How do we find out who is who? What evidence bears on the question of whether the person here now is the one who was here yesterday? One source of evidence is first-person memory... Another source is physical resemblance... Which of these sources is more fundamental? What it takes for you to persist through time is one thing; how we ought to evaluate the relevant evidence is another. If the criminal had fingerprints just like yours, the court may rightly conclude that he is you, but having your fingerprints is not what it is for a past or future being to be you... The persistence question is about which of the characters introduced at the beginning of a story have survived till the end of it. But we can also ask how many are on the stage at any one time... Source: Eric T. Olson, “Personal Identity”, *Stanford Encyclopedia of Philosophy* (substantive revision June 30, 2023).

Mathematics (Euclid)

Source: Euclid. (c. 300 BCE / trans. public domain). *The First Six Books of the Elements of Euclid*, Book I. Project Gutenberg.

DEFINITIONS. i. A point is that which has position but not dimensions. ii. A line is length without breadth. iii. The intersections of lines and their extremities are points. iv. A line which lies evenly between its extreme points is called a straight or right line. xxxii. A circle is a plane figure formed by a curved line called the circumference, and is such that all right lines drawn from a certain point within the figure to the circumference are equal to one another. This point is called the centre. xxxiii. A radius of a circle is any right line drawn from the centre to the circumference. xxxiv. A diameter of a circle is a right line drawn through the centre and terminated both ways by the

circumference. From the definition of a circle it follows at once that the path of a movable point in a plane which remains at a constant distance from a fixed point is a circle; also that any point P in the plane is inside, outside, or on the circumference of a circle according as its distance from the centre is less than, greater than, or equal to, the radius. POSTULATES. Let it be granted that— i. A right line may be drawn from any one point to any other point. ii. A terminated right line may be produced to any length in a right line. iii. A circle may be described from any centre, and with any distance from that centre as radius. AXIOMS. i. Things which are equal to the same, or to equals, are equal to each other. ii. If equals be added to equals the sums will be equal. iii. If equals be taken from equals the remainders will be equal. iv. If equals be added to unequals the sums will be unequal. v. If equals be taken from unequals the remainders will be unequal. vi. The doubles of equal magnitudes are equal. vii. The halves of equal magnitudes are equal. viii. Magnitudes that can be made to coincide are equal. ix. The whole is greater than its part. Citation Project Gutenberg, The First Six Books of the Elements of Euclid, Book I, Definitions–Postulates–Axioms.

Narrative Control

Source: Carroll, L. (1865). Alice’s Adventures in Wonderland. Project Gutenberg eBook #11.

Alice was beginning to get very tired of sitting by her sister on the bank, and of having nothing to do: once or twice she had peeped into the book her sister was reading, but it had no pictures or conversations in it, “and what is the use of a book,” thought Alice “without pictures or conversations?” So she was considering in her own mind (as well as she could, for the hot day made her feel very sleepy and stupid), whether the pleasure of making a daisy-chain would be worth the trouble of getting up and picking the daisies, when suddenly a White Rabbit with pink eyes ran close by her. There was nothing so very remarkable in that; nor did Alice think it so very much out of the way to hear the Rabbit say to itself, “Oh dear! Oh dear! I shall be late!” (when she thought it over afterwards, it occurred to her that she ought to have wondered at this, but at the time it all seemed quite natural); but when the Rabbit actually took a watch out of its waistcoat-pocket, and looked at it, and then hurried on, Alice started to her feet, for it flashed across her mind that she had never before seen a rabbit with either a waistcoat-pocket, or a watch to take out of it, and burning with curiosity, she ran across the field after it, and fortunately was just in time to see it pop down a large rabbit-hole under the hedge. In another moment down went Alice after it, never once considering how in the world she was to get out again. The rabbit-hole went straight on like a tunnel for some way, and then dipped suddenly down, so suddenly that Alice had not a moment to think about stopping herself before she found herself falling down a very deep well. Either the well was very deep, or she fell very slowly, for she had plenty of time as she went down to look about her and to wonder what was going to happen next. First, she tried to look down and make out what she was coming to, but it was too dark to see anything; then she looked at the sides of the well, and noticed that they were filled with cupboards and book-shelves; here and there she saw maps and pictures hung upon pegs... (excerpt continues through the discovery of the golden key, the “DRINK ME” bottle, Alice shrinking “like a telescope,” and concludes at the opening of Chapter II with Alice beginning to cry and forming the Pool of Tears). Source: Alice’s Adventures in Wonderland, Lewis Carroll, Project Gutenberg eBook #11, Chapter I–early Chapter II Status: Public domain Purpose: Narrative control condition (non-explanatory prose, no explicit analytic intent)

Raw Data Corpus

Source: Synthetic numeric dataset generated for control purposes; no semantic or explanatory content.

0.0 0.958698 0.01 1.086002 0.02 0.990485 0.03 1.000554 0.04 0.98929 0.05 0.977965 0.06 0.905674 0.07 1.033446
0.08 1.017465 0.09 1.066641 0.1 1.034267 0.11 1.116514 0.12 1.049697 0.13 1.028237 0.14 1.04963 0.15 0.936258

0.16 1.049317 0.17 1.015315 0.18 1.002825 0.19 0.975797 0.2 1.008084 0.21 0.98669 0.22 1.041109 0.23 1.03252
 0.24 1.022309 0.25 0.992107 0.26 0.990586 0.27 0.89586 0.28 0.941849 0.29 1.048489 0.3 1.046757 0.31 1.13258
 0.32 0.999687 0.33 1.047129 0.34 1.059357 0.35 1.026209 0.36 1.009522 0.37 1.10026 0.38 1.009717 0.39
 1.066111 0.4 0.984178 0.41 1.065882 0.42 0.980022 0.43 1.003094 0.44 1.011913 0.45 1.072541 0.46 1.053947
 0.47 0.956301 0.48 0.94283 0.49 1.014546 0.5 1.028097 0.51 0.954119 0.52 0.952597 0.53 1.089468 0.54 1.016223
 0.55 0.96074 0.56 1.07355 0.57 0.988788 0.58 1.042004 0.59 0.937841 0.6 0.997033 0.61 1.112008 0.62 1.050446
 0.63 0.98857 0.64 0.982708 0.65 0.974668 0.66 1.058135 0.67 1.055455 0.68 1.003426 0.69 1.058913 0.7 1.023242
 0.71 1.069039 0.72 0.976582 0.73 1.09883 0.74 1.065132 0.75 0.970534 0.76 1.082025 0.77 1.056112 0.78
 1.052638 0.79 1.08683 0.8 0.952011 0.81 0.973042 0.82 1.037551 0.83 0.97457 0.84 1.022817 0.85 1.00991 0.86
 1.090793 0.87 1.000284 0.88 0.938092 0.89 0.982729 0.9 0.866808 0.91 1.031538 0.92 1.01375 0.93 0.99694 0.94
 1.052186 0.95 1.064729 0.96 1.02456 0.97 0.994887 0.98 1.000785 0.99 1.042196 1.0 0.928555 1.01 1.072779 1.02
 1.095169 1.03 1.023706 1.04 0.971721 1.05 1.049007 1.06 1.067944 1.07 1.025197 1.08 1.08561 1.09 1.010494 1.1
 1.012098 1.11 1.064346 1.12 1.088629 1.13 1.131017 1.14 1.015629 1.15 1.044523 1.16 1.062916 1.17 0.960721
 1.18 1.004563 1.19 1.016919 1.2 1.020973 1.21 1.049835 1.22 1.094593 1.23 0.989958 1.24 0.972194 1.25
 0.970408 1.26 1.077721 1.27 0.961226 1.28 1.077228 1.29 1.068251 1.3 1.033258 1.31 1.000861 1.32 1.03749 1.33
 0.97118 1.34 1.012812 1.35 1.038507 1.36 0.906379 1.37 1.029513 1.38 1.050688 1.39 1.05098 1.4 1.10933 1.41
 1.04334 1.42 1.078818 1.43 0.996897 1.44 0.992087 1.45 1.01111 1.46 0.990786 1.47 1.005913 1.48 0.978217 1.49
 0.948374 1.5 1.091997 1.51 1.055593 1.52 1.079778 1.53 1.046152 1.54 0.965389 1.55 1.056616 1.56 1.021464
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