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On social intensiology conceptualizing social life through topological folding, braid operators and collapse functions

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ABSTRACT

Social intensiology is outlined here in its connection to morphogenesis. The latter aims to explain how form comes into existence, just as the former seeks to tackle the intensive states associated with social life. A topological reference model is proposed for conceptualizing how social life operates immanently with saliences and pregnancies. The paper starts from the famous Collatz conjecture, and reviews how it has been recently modeled by Danail Valov using braid groups and including thermodynamic irreversibility into the picture. A “Valov braid” can be understood as a manifold, an entity that is, at the same time, individual and collective. Its collective structure can be reconstructed, through its operational logic, as a tensional field. An attempt is made to show how phenomena of memory and measure are intertwined with the braid’s developments, giving rise to a rich, multi-faceted present that lives in non-coincidence. Within such a framework, rhythmanalysis is discussed as a useful tool for both assaying and experimentally improving social life.

Introduction: approaching the operational space

The Collatz conjecture is a famously unresolved problem in arithmetical dynamics, first formulated in the 1930s by the German mathematician Lothar Collatz, and commonly presented as follows:

$$f(n) = \begin{cases} n/2 & \text{if } n \equiv 0 \pmod{2}, \\ 3n+1 & \text{if } n \equiv 1 \pmod{2}. \end{cases}$$

On the face of it, the function reads simple: if the positive integer is even, then it is going to be halved, if it is odd, then it is going to be multiplied by three and increased of one unit. The conjecture holds that the function will eventually always go to 1 after a certain number of steps, that is: $f_{\min}(N)=1$ for all $N \in \mathbb{N}+1$.¹

What makes the Collatz conjecture mathematically intractable is its iterative nature, as is also the case for other classic mathematical problems, such as for instance the Diophantine approximation and the peculiar behavior of prime numbers.² The recursive complexity of the structure associated with Collatz trajectories (or orbits) is, in fact, astounding, and it keeps entertaining mathematicians to date. Recently, it has been suggested by Danail Valov (2025) that what is at stake in the Collatz function is more than an arithmetical-computational riddle. Valov indeed proposes to interpret the function as a recursive system of symbolic logic, whereby “the even

path contracts, moving the integer closer to collapse, while the odd path expands, injecting memory and motion into the system” (*ibid.* 3). The Collatz function thus appears to Valov as a complete formal system, whose construction proceeds from two fundamental operators: an “Odd Expansion” $\mathcal{O}$ that infuses torsion into the trajectory, and an “Even Collapse” $\mathcal{E}$ that releases tension from it. The import of this is that even a simple system of equations can produce an open, indeterminate operational space with rich and unexpected turns (Figure 1).

Such an operational space exists, not only until the mathematical conjecture as a whole remains unproven, but also concretely for each actually occurring trajectory, until it “collapses” to value=1. The basic operations of summation and subtraction can be regarded, in this sense, not as rote operations (“brute computation,” as per Valov), but as already manifesting the fundamental anabolic and catabolic tendencies inherent in life. We can take from Valov the idea of considering Collatz trajectories as *tensional* and *memorial* morphogenic operations, and we can inquire into the topological folding of such structures caused by an intensive dynamism. Most importantly, we can attend to the meaning and the value thereby produced. Our working question can thus be phrased as follows: Can the consideration of formations of this type prove useful for investigating at least some of the inherent significations and valorisations of *social life*? Valov seems to think so, but his elaboration in sociology remains cursory (2025: §11.4).

In what follows, I propose to pursue the approach outlined by Valov into social dynamics, in the hope that it may help to highlight some properties of social life. While doing so, I complement the model with my previous reflections into what I have designated as the “critical moment between two and three” in morphogenetic domains (Brighenti 2025).³ This seems pertinent, if we just recall that the two basic arithmetical operations defining the Collatz function generate, not two, but *three* types of trajectories: convergent, divergent and non-trivially cyclic,

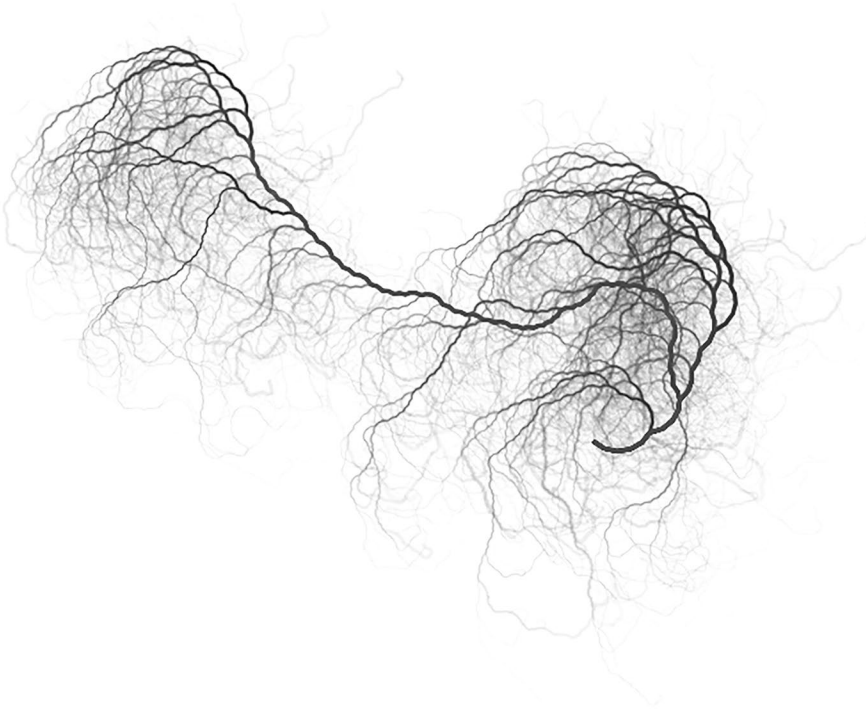


Figure 1. Visualization of Collatz trajectories for 2000 random numbers up to max = 200M (generated with code available at <https://github.com/abogatskiy/collatz>, accessed July 1, 2025).

or spiraliform (Lagarias 1985). The attainment of three starting from two is, indeed, one of the most complex operations conceivable in terms of continuity, not least because both two and three are prime, with two being the only even prime number. Overall, *discontinuity* seems to dominate the situation of two and three, and yet, at the same time, we can take from C.S. Peirce's theory of *synechism* the idea that the explanation of any discontinuous formation necessarily calls for some underlying continuity to be deployed so as to bridge what looks unbridgeable—or, if one wishes, to connect *identity* to *nature*. Consequently, our more general problem can be said to consist in co-articulating continuity and discontinuity in reconstructing the achievement—as well as the vagaries and the eventual loss—of form.⁴

On form, in the light of intensity

I propose that we recognize in the Collatz function a specific manifestation of the living form, and more specifically of social formations. This function is only an example that may help to highlight the relation between form and intensity. A domain that might be labeled “social intensiology” entails a theoretical approach to society that includes a consideration of those magnitudes René Thom (1988) first called *pregnances*. For Thom, a pregnancy is an informal propagative force that enters into contact with a *salience*, an already-existing, discontinuous form endowed with some degree of stability. That social life progresses through intensive states encountering formal arrangements may not come as a tremendous surprise to sociologists, since Durkheim (1912) first insisted on the function of rituals as intensification procedures enacted by the social group, and he identified the basic rhythmical, cognitive and axiological orders of the group as articulated around the two distinct energetic levels, which he dubbed, respectively, “profane” and “sacred.” For all the undeniable importance of the Durkheimian induction, a general theory of intensity beyond simple categorial, or even metrical, parameters, is still lacking in the social science. The hypothesis entertained here is that it may be possible to develop social theory in the direction of laying out a topology of such social intensive states, so as to specify its logic and operators.

To begin with, what makes intriguing the parallel between formally-defined objects such as Collatz trajectories, and social situations, is that both are *asymmetrical* and *irreversible* deployments. It is known that life fundamentally requires symmetry breaking—such as typically, chirality in molecules (with left-handed molecules building up life on Earth), membranes in cells (separating inside and outside), lack of symmetry along the anatomical transverse plane in animal anatomy (providing for left vs right sides and spins), etc. A form is not simply a spatial accomplishment; it is also, inherently, a temporal one: *form has memory*. As shown by Valov, the Collatz trajectory can be modeled as a topological braid group structure⁵—henceforth, a *Valov braid*—modeled in a braid space $\mathbb{B}$ that evolves through a series of movements involving subsequent twisting and straightening. Thus, each Collatz trajectory can be visualized as a string in the braid group (Figure 2).

A Valov braid exhibits a variable curvature with multiple crossings along the operational series, with each crossing bringing about an irreversible variation in the whole group. Most notably, as a consequence of its internal crossings, the braid can encode a memory of its own. In addition, what is specific of the Vallic> appears as energetically favorable: it does come at a cost, which is, however, cheaper than non-folding. As all things living, the braid exhibits growth waves that come to be canalized into series of pathways. To say that the function collapses means saying that the braid unwinds thoroughly and its curvature flattens, at last completing its descent into simplicity: such is the conjectural endpoint of identity ($n=1$; death); complementarily, until the braid keeps twisting ($n>1$; life) the function remains in a state of non-coincidence with itself. All curvature in the braid is a measure of the on-going condition of internal contradiction. The latter is progressively resolved through “work,” which of course comes with thermodynamic costs. What imprints directionality to the braid, is the presence of chiral (non-symmetrical, “handed”) moments of folding. In this sense, symmetry breaking is

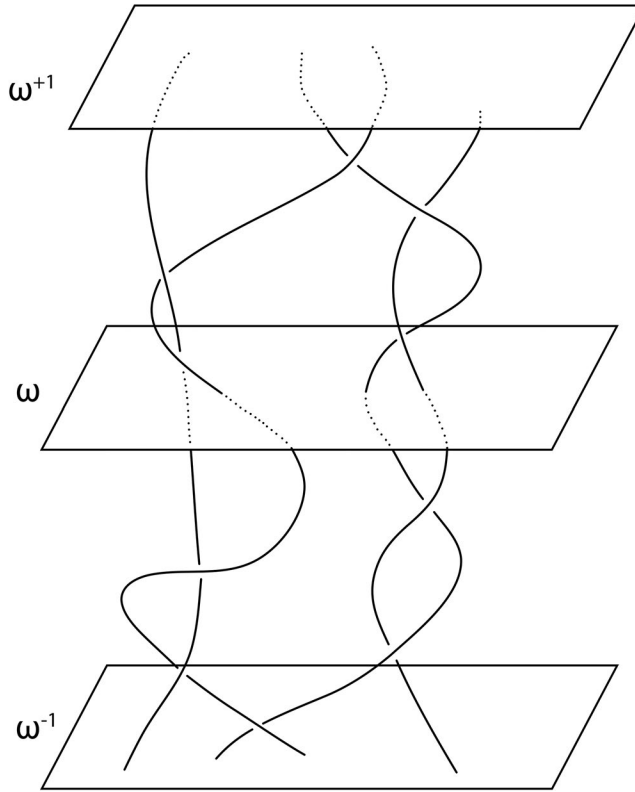


Figure 2. Example of braid group with four strings (Redrawn by the author on the basis of https://encyclopediaofmath.org/wiki/Braid_theory, accessed July 1, 2025).

what enables the deployment of all trajectories in $\mathbb{B}$: not entirely inimical and not entirely alien to coherence, the deployment of asymmetry delays its attainment by incorporating (a dose of) it. If coherence can be said to be the way toward intended death, chirality oversees a dynamic that is entirely *cathectic* in nature: it accompanies what ultimately denies it.⁶

The structure of the Valov braid can, at each moment, be modeled as a *manifold*. With Whitehead (1978 [1929]: 21), we can also call it “novelty,” or “concrecence;” with Deleuze and Guattari (1980: 45), a “multiplicity.” The sign that something decisively *social* is at play lies in the co-articulation of unity and plurality. A manifold is an irreducible society, a “population”—or, as we can also try to understand it, a “peopling.” In his process philosophy, A.N. Whitehead understands “novelty” as a complex operation, whereby a new unity emerges from “a company” of coexisting occurrences:

The novel entity is at once the togetherness of the ‘many’ which it finds, and also it is the one among the disjunctive ‘many’ which it leaves. (Whitehead 1978 [1929]: 21)

Deleuze and Guattari also advance a model for novel entities. They object to dichotomy (i.e., radical discontinuity) as a mode of reasoning, critiquing the “image of thought” corresponding to the tree structure, with its progressive branching off. The tree, Deleuze and Guattari contend, leads to a hierarchical understanding of phenomena that reinserts some variants of Platonic idealism, i.e. of transcendence. In contrast to the tree, retrieving and reclaiming the tradition of Humean empiricism, the two French theorists propose the *rhizome* as a topology of inter-connecting heterogeneous parts, which can either entangle with or disentangle from one another. As a “novel entity,” the rhizome is made, not of points, but of *lines*. Its magnitudes are not quantities, but *quantitative variations*: vectors, gradients, connections. However, because the

manifold resists being treated as an object, any quantitative determination cannot simply be achieved by measuring the phenomenon with preexisting metrics:

We do not have units of measure, only multiplicities or varieties of measurement ... Multiplicities are defined by the outside: by the abstract line, line of flight or deterritorialization following which they change in nature as they connect with other multiplicities. (Deleuze and Guattari 1980: 15-16; my translation)⁷

The “flight-line” as the external (or extremal) movement of the manifold constitutes the *status nascens* of a new measure (*mensūra mensurans*), which the manifold procures for itself as it evolves. Considering the Valov braid as a manifold implies looking at it simultaneously as an individual *and* as a society. Rather than either as a collection of complete, already-achieved individual entities or, conversely, as a single totalized collective fact, the manifold is better imagined as a *multidimensional event*.⁸ Adopting Whitehead’s ontology, we are dealing with processual, rather than substantive, realities, whereby the world is made, not of things, but of “actual occasions”:

An actual occasion is nothing but the unity to be ascribed to a particular instance of concrescence. The concrescence is thus nothing else than the ‘real internal constitution’ of the actual occasion in question. (Whitehead (1978 [1929]: 212)

The deployment of the Valov braid is a fitting illustration of such a Whiteheadian “concrescence” of reality. We can start from here to venture into an analysis of the “internal constitution” of social life. An “originality” happens, not at the beginning of a series (such as a supposedly “first event” that initiates the series), but right *in the middle* of the operative space.⁹ Such a special *density of the present* is what Whitehead also effectively calls “the clutch at vivid immediacy” (*ibid.* 105). As highlighted below, this phenomenon of growth-from-the-middle turns out to be noteworthy for every attempt to conceive social morphogenesis.

On memory, as deployed in virtuality

Not only do forms exist *in time* and occupy a stretch of it, but they more specifically possess their own *internal time*, defined by their constituent logic.¹⁰ The form’s internal time is what, above, has been referred to as the *memory* of the braid. Henri Bergson’s (1896) notion of memory can assist us here in conceptualizing memory as a kind of *second present*, rather than a trace of the past. Memory does not record the present, nor does it belong in an archive of the past; it is, rather, a *further present* constantly superadded to the extant one. Memory, Bergson remarks, surrounds any present perception in circles, with “memory circles” growing upon one another in an organic circuit:

Conscious perception is a circuit in which all the elements, including the perceived object itself, are in a state of mutual tension [...] an act of attention implies such a solidarity between the mind and its object, it forms such a closed circuit, that we cannot pass to states of higher concentration without creating from scratch as many new circuits which envelop the first one, and which have in common only the perceived object. (Bergson 1896: 114; my translation)¹¹

Memory is constantly superadded to, or injected into, the present—but this addition, this injection, is not to be understood as confusion, nor conflation. The reality of memory is *virtual* rather than *actual*. The two cannot mix. As per Charles S. Peirce’s (1902:763) definition, the virtual is “something, not x, that has the virtue/efficiency of x.” In this vein, memory accompanies the actual present and lives with it, yet it comes in a distinct mode of being (Figure 3).¹²

Only the actual is local, as opposed to the chance of “non-locality” being enabled by the virtual.¹³ Memory, in this sense, expresses the condition of temporal *bifurcation*: time bifurcates in a way that is *not* analogous to how trajectories bifurcate in space, but spatial bifurcations—such as the chasm between *O* and *E*—would be inconceivable without temporal bifurcation. Operating, in other words, shapes time. At each step in the trajectory of the Valov braid, odd

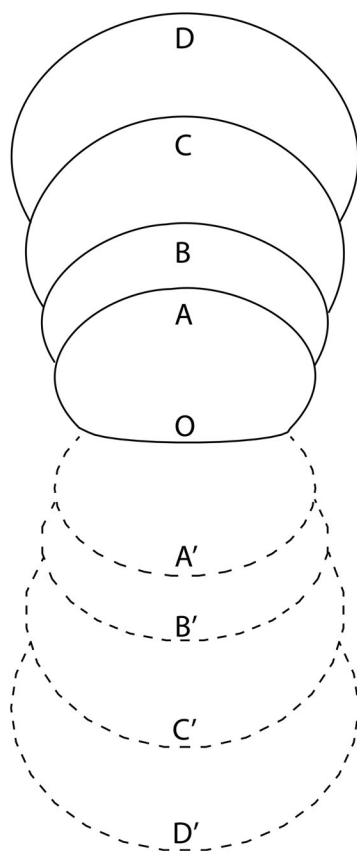


Figure 3. Memory expands and deepens the present. Bergson's illustration of perceptual expansion from present object O (upper circuits) being correspondingly matched by deeper levels of reality (lower circuits). (Redrawn by the author on the basis of Bergson 1895: 115)

results entail tension injection, whereas even results bring about curvature release: as the braid unfolds this way, its time (its “eigenvalue”) comes to be subjected to variable gradients of compression and distension. This means that memory expands with the roughening of the curvature and contracts with its flattening, until dissipation is reached (alternatively said: expansion and contraction are but two names for the workings of memory). That is why each braid expresses its own unique internal temporal reality, and the coordination of the different internal times into a shared temporality—where “external” time confers “synchronisation” or bridging—is a non-trivial question to be considered each time two or more manifolds get into contact.

What the Valov braid enables us to see is that memory is *tensional*. The “struggle” between memory and amnesia is the same as the struggle between reversibility and irreversibility, as well as the struggle between tensional injection and curvature relief. By the same token, the Valov braid is both a *collective structure* and an *operational logic*: it comes into existence through the crossings and the returns it performs in its deployment.¹⁴ The crossings of the braid connect the various “moments” that are present along its trajectories. The basic cornerstones guiding through moments are the two operations of repetition and difference, whose relation is not simply antithetical (Deleuze 1968). In sociology, Gabriel Tarde (1890) first envisaged social existence as grounded in imitation, which in turn he conceived of as a manifestation of the more general phenomenon of repetition. Society, for Tarde, does not simply repeat itself: it also constantly breeds new inventions by crafting syntheses of previous imitations into unforeseen outcomes. In the topological reconstruction attempted here, such syntheses equate with the braid's crossings. Each return in the trajectory of the braid comes about as “looping” i.e. as a

spiraliform trajectory that approximates identity only at collapse—while, for the rest of time, it keeps *synthesizing*. Just like a Valov braid, social formations, too, resist reaching identity, and progress through “inventions,” for which memory is crucial. Because, as considered above, memory is a fundamentally tensional morphism, the recursive iterations of the braid do not produce a plain type of repetition. Rather, they entail *deformation*. Memory is that which *cannot not* be deformed, and only effectively works *through* deformation, approximating what Thom (1975: 101-2; 130) calls a “metabolic form.” A metabolic form, as opposed to a static one (the difference being a matter of relative degrees, not of nature), is defined by a kinetic development intimately tied to the fine dynamics of its attractor: its topologically complex boundary renders the metabolic form quite sensitive to perturbations and, consequently, always open to the possibility of a catabolic catastrophe. It is remarkable that two metabolic forms have the unique capacity to resonate with one another, thus coming to function as a “significance carrier.”¹⁵ The possibility of invention is encapsulated here, that is, in moments when deformation itself becomes meaningful. Oblivion is, by contrast, *indéformable*: it functions as an “active nothing” that refuses to resonate.¹⁶

In sum, a braid trajectory stores within itself the memory of its own recursive unfolding as a specific virtual *tensional field*—or, as Valov (2025: 12) puts it, “each folding step reduces recursion depth while preserving structural intention.”¹⁷ Simultaneously, the operational logic of memory brings the braid into resonant possibilities whereby meaning is constructed, while concurrently the central operational space thickens *inventively*.

Analysis situs in Valov braids

We are coming to the realization that a manifold is not an “object”—it is never simply entirely *what it is*.¹⁸ Its non-self-coincidence is tied to its virtualities, or, as we might also say, its *developments*—all the developments being virtually contemporaneous in the “autochthonous” present. The Valov braid is an *anhologomic* system, in that it cannot be represented by independent coordinates, being, instead, fully dependent on its own previous states. The description of the braid’s development thus turns into a veritable *social ethogram*. The braid’s successive returns can be observed as “refrains” in Deleuze and Guattari’s (1980) sense. A refrain is a returning motif that configures a territorial setup—where a territory is, in its first instantiation, the manifestation of a *critical distance* in intra-specific encounters (encounters between members of the same species).¹⁹ As seen above, a manifold is not *made of* individuals, rather, it is *itself an individual reality* whose constitution (composition) is defined by dimensions, each of which has the status of singularity the moment it enacts itself as an “actual occurrence.”

This means that a singularity is the actualization (viz., the “becoming-actual”) of an *object* as it manifests a certain state of the system, vis-à-vis which the manifold can be regarded as its *subject*. Subject and object are not ontological realities, they only work as a relational couple. In other words, one cannot have the one without the other; they come about as correlatives of the one and same operation: one element becomes subject only by having (placing, entertaining) an object in front of it. There is a fundamental difference, though: subjectivity is virtual, not actual. Virtuality is peculiar of the subject, as opposed to the object, which is relegated in actuality. This can be confronted with Whitehead’s idea of associating, on the one hand, the actual with the discontinuous and, on the other hand, the non-actual (which Whitehead calls precisely “potential”) with the continuous: “Continuity concerns what is potential; whereas actuality is incurably atomic” (Whitehead (1978 [1929]: 61).

In his earlier attempt to formalize sociology, Simmel felt he had to consider the forms of *two* and *three*—i.e., the interacting “dyad” and “triad”—as basic actual instantiations of social reality. The dyad, Simmel associated with “intimacy,” given that in this case the social structure has only a thin independence from the parties, whereas the triad, he saw as the coming-about of objectivity, given the third’s “detached” position as witness (or judge, referee, reviewer, etc):

In any event the grouping of three stands in contrast to the dyad as a fully new structure, the latter characteristically distinguished in such a way that the former is specifically distinguished backwards against it but, however, not forwards against increased groupings to four or more elements. (Simmel 2009 [1908]: 98)

It is interesting to notice how Simmel himself had to struggle with the hiatus between—and the apparent impossibility of—two and three. While it is not necessarily a mistake to consider the interactional possibilities afforded by dyads and triads, an inconvenience came about once other scholars equated such forms with the presence of as many distinct individual subjects entering the interaction system—in the sense that the dyad would be made of two subjects, the triad of three, etc. This move overlooks the fact that each “one,” each unit, is already a social manifold, once virtuality is factored in. In this respect, a point powerfully made by Gilbert Simondon (2013 [1964–1989]) in his theory of individuation, is that it is precisely through their *non-individuated* dimensions that individuals can communicate. Simondon dubs this “central operational zone” the “trans-individual,” which he juxtaposes to the pre-individual and the individual, all three conceived as different “phases of being.”

Processually and relationally, the individual results from an operation of individuation conducted within a social milieu; but the ensuing individuated being *still contains* within itself a residue of the pre-individual reality out of which it has been constituted; and this residual reality can be prolonged toward trans-individuality, that is, into the discovery of new significations attached to the social condition itself.²⁰ Once we set the theoretical gaze onto the individual being, we can observe that the phases of being that are not amenable to individuality (or which have not yet been fully integrated into its individual reality) are revealed in the guise of *emotion*:

...emotion is a potential which is discovered as meaning as it structures itself in the individuation of the collective ... as a conflict between pre-individual reality and the reality individuated in the subject ... It is not a disorganization of the subject, but the beginning of a new structuring, which can only be stabilized with the discovery of the collective. (Simondon 2013 [1964–1989]: 305–6; my translation)²¹

Emotion is a problem the individual cannot solve by itself; in fact, it is what, inside the individual, foreshadows the participation in a different reality—not the collective, but the transindividual, *sive*, proper “social individuation.” Simondon’s transindividual corresponds, in practice, to what above we have called the manifold, with its dynamic-quantitative, mnemonic and bifurcating capacities. The non-individuated social quantum is pre-individual and impersonal; it is also informal and circulatory. This explains the role of traveling pregnancies in the coming about—as well as the overcoming—of salient forms. Thom (1988: 53–4) articulates a diagram to map the salience-pregnance dynamics, which I have discussed more extensively elsewhere (Brighenti 2025). Here, it may be interesting to remark that the notion of pregnancy fits neatly within what Whitehead in his philosophy calls “creativity,” namely:

The definiteness of fact is due to its form; but the individual fact is a creature, and creativity is the ultimate behind all forms, inexplicable by forms, and conditioned by its creatures. (Whitehead 1978 [1929]: 20)

If we reconsider now the Valov braid as a case of creative “peopling,” a space of recursive and criss-crossing trajectories (Whitehead’s “creatures,” in the quote above), we can seize better its specific dynamics of contraction, contradiction, and return, as the modes of internal resonance (meaning-making) in the braid group. What gets folded, and what consequently unfolds, are not simply the braid’s trajectory and the operators that define it, but also the very dimensions of the manifold: it is in this sense that the manifold can attain different “degrees of existence” through its developments.²²

Deploying social intensiology through topology, elemental theory, and rhythmanalysis

To further the interpretation of social life as instantiated in topological Valov braids, we need a more insightful conception of the three movements of contraction, contradiction, and return, along with the degrees of existence they imply. A suggestion is that contraction, contradiction,

and return, could be envisioned as different facets of the same *present tense*—facets which we might call, respectively, *æonic*, *kronic*, and *chronological* (Brighenti and Kärrholm 2020: §3). In process-realities, the present is made of occurring actual occasions reaching “satisfaction” (Whitehead 1978 [1929]: 25–26). But the self-enjoyment of the present happens manifoldly. *Æonic* present is timeless, eternal: it is present as *presence*, completely contracted and achieved (if Collatz’s conjecture is correct, there will always be contraction). *Kronic* present is, by contrast, fraught with tensions and contradictions: it is present as played out in the central operational zone of the function, insofar as curvature persists. It is the struggle of unraveling. Finally, the chronological present envisions return through semi-cyclic or spiraliform trajectories, whereby the present time becomes the instantiation of a larger pattern, which can be foreseen rhythmically.

The present harbors both its past as memory, and its future as bifurcation. That is why there is also something in the bifurcation of the present that entails oblivion, in the sense that the loss of memory is not simply the obverse of what memory has not yet covered in its continuing expansion, but is, rather, akin to a “zone of active nothing” (Bachelard 1950: §VIII, II). *In time*, collapse is not to be imagined a single final event—rather, collapse is of the same nature of the resonance that aligns phases and coheres (straightens) recursion. Collapse must be conceptualized, not as the end state of the manifold, but as one of its extreme and yet always embedded moments. Following Thom, the terminology of “attractor” may be applied. In the life of a manifold (the life of an individual, the life of a couple, the life of a group, the life of an institution, etc...), death is not just a one-off event, but in fact, a series of peculiar events, out of which the possibility of a new repartition of actual and virtual is prepared. Simplicity is the permanent limit entertained by the manifold, but the ultimate is—as Whitehead once had it—*creative* (or, with Tarde, *inventive*).²³ The question concerning how is it possible that a vital process contains its own self-estrangement has been central to Simmel’s late work (2010 [1918]: §I)—a question which Simmel answered by positing life’s *immanent transcendence* (i.e., self-transcendence) as a third principle beyond duality and unity.²⁴ In its attempt to grow, in its thirst to become “more-life” (*mehr Leben*), life includes its own self-distancing into “more-than-life” (*mehr als Leben*). That is why *becoming* is so crucial for the manifold. Through its returns, the Valov braid does not simply increase the complexity of its memory, preparing the inception of oblivion: it also surveys its own states, it takes notice of its own becoming, pushing outwards its virtual expanse. Its self-survey is not instantaneous (in other words, it is not purely conceptual), rather, it operates on the basis of the braid’s capacity to operationally contract and curve. It unfolds at the operational, “thermodynamic” speed of the braid itself—and that is why its power to *transcend* can be said, with Simmel, to be *immanent*.

The process of self-flattening of the braid’s curvature equates with the progressive playing out of the degree of “kronic” contradiction built into the braid’s own memory, putting to test its capacity to bifurcate (*sive*, imagine). As a whole, the Valov braid seeks to resist collapse, behaving *until its very limit (intra vires...)* like a system that is immune from it, despite the fact its descent toward identity is intimately tied to its thermodynamic catabolism. The difficulty lies with thinking collapse, not as one single fact, like a stop-point, but as a whole series of such events. What is more interestingly, it that it is a series of events *capable of creating meaning*. Let us quickly reconstruct how this comes to pass. Each orbital loop is, regardless of its fidelity, a manifestation of return. If the braid is structurally defined by its returns, then it is also possible to measure the *phase* of its looping trajectories. In his models, Valov shows that the increase of phase coherence across the loops corresponds to the measure of the braid’s unfolding. What drives the trajectory’s progress toward identity is, precisely, the increase in phase coherence (again, a phenomenon of resonance). Yet, simultaneously, there are in the braid a number of “motifs” that are immune to folding. These motifs—such as the presence of patterns capable of preserving the curvature, or phase-symmetric sequences, and so on²⁵—can be said to be *eternal*: they constitute the manifold’s own signature (or *intention*, as considered above).²⁶ Social intentionality deals precisely with the relation between the *thermodynamic* and the *eternal* dimensions

of a Valov braid: such a relation exists at the very limit between what can be measured and the unmeasurable.

Considered as “measuring measure”—i.e., as the experimental moment that institutes measure—intensity exists in a space *before metrics*. It is not entirely formless, though. As Paul Valéry once put it, *le fond n'est qu'une forme impure*, “the background is but an impure form.” The strange form that does not look like a form at all, is a background dense with morphogenetic potential. For his part, Thom (1975) attempted to model intensity dynamics through the topology of attractors and the geometry of their basins. However, the notion of pregnancy, introduced by the later Thom (1988), alerts us to the fact that intensity cannot be reduced entirely to a sheer matter of quantity, but must be imagined as a more complex mathematical *category* (Figure 4).

Gradients, pathways, and the temporal regimes attached to them are integral to any given specific pregnancy acting as a type of actually-occurring force. The latter's spatiality may look perplexing at first, because intensity, taken by itself, has no *place*—rather, it is the pure *degree of its existence*: present-as-outgrowing-from-the-source, as we may say. What Simondon referred to as the “central operational zone,” is but the consequence of a surge in intensity (“peopling”). In previous work (Brighenti 2017), I have explored the possibility that the search for a spatial model apt at capturing social life may take advantage of the ancient, venerable notion of “element.” The outcome of that research indicated that the element of social life manifests itself as a peculiarly excitable, reactive medium, which can be indicated as “the visible.” In a sense, the visible equates the space of all possible awkward, clumsy outcomes in interaction. The adjective “social” by itself signals that things can go wrong at any time. More work is needed to figure out which sort of mathematical and topological space an element actually is. Still, it is intriguing to attempt to frame social intensiology as an *intensiology of the visible*. For instance, if we return to the notion of *refrain*, and the territoriological approach it evokes, we can easily picture the dynamics associated with an intensive, visible element understood as the expressive regulator of the manifold in its operational dynamics. The refrain “elementally” establishes an *allure*, a “pace,” an agility in moving across milieus, and, with the apparition of rhythm, also a capacity to “make territories.” Such is the power to assert purposeful organization of interaction through the institution of critical distances and unique moments endowed with sense. Social life must, in a sense, be “written in the visible” for its morphogenetic adventure to take hold. The possibility of significance stems from its elemental texture.

In the 19th century, sociology was born under the auspices of natural science: its foundational ideal was one of a discipline that would be investigating the social phenomenon by deploying the scientific method, grounded in mathematical language and the collection of positive data. More

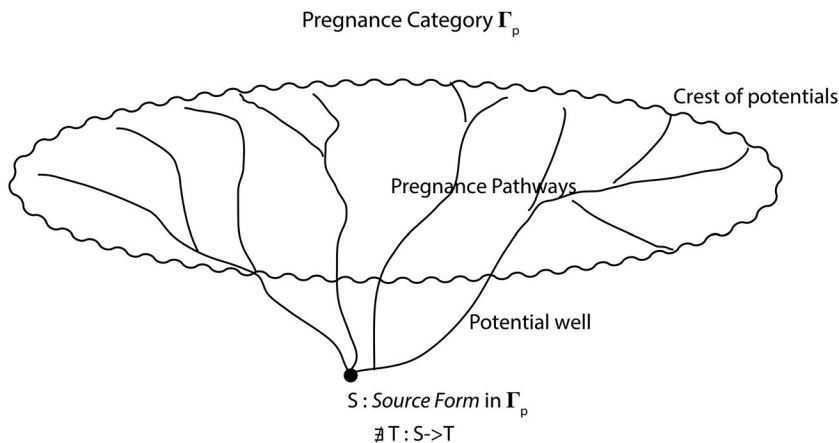


Figure 4. A pregnant form S is said to be “source” in the category (Γ_p) if it can be modeled as extremal (no other form T can assure the same intensive regime) (drawn by the author on the basis of Thom 1988: Fig. 1.2).

precisely, the disciplinary foundation of sociology, in the generation of Durkheim's and Weber's, was attained through the crisis of earlier positivism, which had assumed progress to be inevitable (Wagner 2008). This explains why sociology was simultaneously also conceived of with a practical reformist ethos in mind, as a tool to attend to the social evils and the imbalances created by modernity. In fact, sociology's therapeutic mission largely corresponds, not only to Social Work as an institutionalized area of social assistance and support, but also to the strong orientation, present in both general sociology and specialized social research, toward discussing the "compelling social problems" of the present (poverty, crime, migration...). With such a roughly sketched epistemo-historical context of the discipline in mind, one may wonder what could be the import of the proposal discussed here based in a theorization of social life through topological Valov braids, with their attending operations of folding, resonance, return, and collapse. While clearly it is not possible to tackle the whole challenge here, a first indication seems to lie in emphasizing that, if sociology is *also* to be a practical discipline, then it must include *rhythmanalysis* within its compass.

As seen above, phenomena of rhythm (orbits, cycles, returns etc.) and resonance (significance, coherence etc.) are deeply entwined with Valov braid's modeling. Here we need to consider *rhythmanalysis* more widely, in the original conception outlined by Gaston Bachelard—namely, as a *therapeutic*, rather than simply *analytical*, tool (Bachelard 1950: §VIII). Drawing from the Portuguese philosopher Lúcio Alberto Pinheiro dos Santos, in the 1940s Bachelard first envisaged *rhythmanalysis* as a broad alternative to psychoanalysis, or better, as an enlarged and more hopeful curative practice, whereby Freudian "ambivalence of feelings" gets prolonged into a veritable "dialectic of durations." Bachelard outlined a "philosophy of rest," seeking to restore *rest* to its original importance vis-à-vis *activity*. It is important to remind ourselves of Bachelard's resting moment in the context of a process philosophy *à la* Whitehead, which has informed the this article. Following Bachelard, rest must be recognized, not as lack of activity, but to the contrary as one of its crucial motifs. A rhythm is necessarily a composition of operation and rest, so that, for instance, when it comes to the social reality, it is never simply a question of reclaiming an adequate alternance of work and rest, but rather a question of asserting rest *inside* work itself. Rest is the active, nomadic presence in the rift between Odd Expansion *O* and Even Collapse *E*. Bachelard's rehabilitation of rest seems particularly helpful in performance-oriented societies, which tend to produce deep misunderstandings about notions of comfort, holiday, and addiction.

A practical wisdom of measure does not entail having ready-made solutions at hand, nor imposing one-size-fit-all solutions. The main point lies with entering a more experimental dimension of associational life, where intensities are grappled with and measures are first etched. Braid-thinking may help progressing both theoretically and practically toward a "pharmacology," i.e., an analysis of *pharmaka* as ambivalent remedies, and the *cathectic* dynamics associated with each of them (*cathexis*: entertainment of the opposites). The idea that resonance is fundamental to breed significance, but that it *also* furthers collapse, can become a vital node of practical life, making it clear that all sorts of failures are associated with bad rhythmic compositions and undesirable resonances speeding up destruction. The unresolved situations manifest themselves in the braid in the guise of *emotion*: rather than irrational, emotion has a fundamental logic that is grounded in the tensional nature of the braid itself. Because collapse is not a final event, but a permanent limit of the braid's unfolding, coincidence and non-coincidence can be assayed *in vivo* through rhythmicity. Learning morphogenesis may assist in canalizing growth waves into adequate pathways, while in turn *rhythmanalysis* may help with the posology of social *pharmaka*, in pursuit of a practical wisdom of measure that be fully accountable to social intensity, and not in denial of it.

Conclusions

Are the dead part of society? The question is heuristically useful, in that the dead are located at the convergence of memory and oblivion, of mnemic and amnesiac turns. The dead are

nothing but memory, and yet they also are part of that *active nothing* clearing the way toward the braid's movement of return: the manifold itself as becoming. What Valov calls the “symbolic logic” of the braid can be seen reflected through Peirce's idea that, basically, *symbol* equates with *purposefulness*, in that the symbol always seeks to further determine its interpretant. Such purposefulness is the same “third principle” introduced by Simmel in his view of transcendence-in-immanence (and which Thom sought to formalize as a neo-Aristotelian physics of meaning). Simmel counted it third, after duality and unity.²⁷ But we can also regard it as an *unknown fraction* x between two and three, *the place where* and *the way how* continuity and discontinuity get co-articulated in the attainment of return. Certainly, it is anything but easy to reconcile purposefulness with the inherent fact of growth-from-the-middle that contradistinguishes living dynamics. In practical conditions, our predicament is that often we need value, but we don't know what it is; and we can't know value, nor measure it, without experiencing it as intensity, that is, without unwinding it in the pregnancy-salience schema, making sense of it as rhythm.

Society lives in form, which always conserves depth and richness not yet explored. The encounter of metabolic forms breeds resonance, which reads as significance on the one side, collapse on the other. On the one hand, *there's more than meets the eye*, on the other, *not all is there that meets the eye*—because in the element of the visible, the actual is surrounded by and infused in the virtual. The valence of form is memory, its capacity, bifurcation. Social intensiology can learn from morphogenesis how to improve an understanding of *source forms* (those endowed with greater stability) only to the extent that morphogenesis gets, in turn, capable of incorporating the labor of pregnancies, their animational strengths, their odd expansion. From actual occasion to actual occasion, the social-operational progress sets the rhythms shaping the braid's own time. New value and new measure loop around one another: they can never really square, but they do not stop resonating. The braid's collective structure can be modeled as a tensional field, which, with Simondon, we have called its *central operational zone*. Within this central zone, a theory of moments of the braid's development can be used to articulate its many-faceted present—æonic, kronic, and chronological presents, corresponding to the operations of contraction, contradiction and return. As the braid develops through unfolding, a flight-line (such as an unsettling masterpiece of art) will always be the *incognitum* dragging the whole manifold with it.

To say that peopling is the reality of the braid as manifold means adhering to an immanent-based perspective on society, which admits as integral to the social element all its unresolved situations and its emotional predicaments. That is how rhythmanalysis can assist with developing an inventive wisdom of emergent measure: never as a generalist solution—a “law” –, always as an exploration of the unity of value throughout its manifold manifestations—an “individual law”²⁸, an idiosyncratic pharmacology, an entertainment in nonidentity.

Notes

1. For a basic introduction to the problem, see https://en.wikipedia.org/wiki/Collatz_conjecture (accessed July 1, 2025). A classic presentation is given by Lagaris (1985). Probably the most important recent advancement into the problem is Terence Tao's (2022).
2. The Diophantine approximation concerns the problem of approximating real numbers by rational numbers. Some of the most exciting development in contemporary number theory revolve around Diophantine analysis. Suffice to recall the so-called ‘abc conjecture’ (Osterlé-Masser conjecture, mid 1980s), and the recent break-through by the Japanese mathematician Shinichi Mochizuki, with his ‘Inter-universal Teichmüller theory’, laid out in the early 2010s and still generating a lot of discussion.
3. There is no claim of absolute originality. Indeed, important work in contemporary sociology has already been made by Andrew Abbott (2016) in the field of processual sociology, Margaret Archer (2013) and Andrea Maccarini (2019) concerning social morphogenesis, John Urry (2005) and others to introduce and implement complexity science for social research, following up on the earlier adaptation of cybernetics by social systems theory (Luhmann 1995[1984]). The specific contribution of the present paper resides in the attempt to model, or at least attend more closely, intensity as a defining feature of morphogenesis.

4. A background to this discussion is provided by the work of the French mathematician René Thom, whose leitmotif is precisely the co-articulation of continuity and discontinuity, and the explanation of sudden discontinuities ('catastrophes') in terms of underlying continuous processes.
5. For a basic introduction to braids, see https://en.wikipedia.org/wiki/Braid_group (accessed July 1, 2025). In Ambrogio Lorenzetti's fresco of 1338, social harmony is curiously illustrated with the image of a rope clutched by the citizens: 'concord' is explained, not through reference to *còr*, *cordis* (heart), but to *chorda*, -ae (string).
6. A similar reconstruction of cathexis is provided in Brighenti (2023) via a discussion of Freud's notion of *Besetzung*.
7. In the French original: "Nous n'avons pas unités de mesure, mais seulement des multiplicités ou variétés de mesure ... les multiplicités se définissent par le dehors: par la ligne abstraite, ligne de fuite ou de déterritorialisation suivant laquelle elles changent de nature en se connectant avec d'autres".
8. In another paper, I have suggested that this multi-dimensionality can be more precisely explored as 'polycontextuality' (Brighenti 2026).
9. Incidentally, a rejection of the search for 'first occurrences' also characterizes Norbert Elias's sociology.
10. A similar insight is also clearly present in cybernetics and systems theory. Unfortunately, it is just not possible to unravel all these connections in this paper.
11. In the French original: "Nous prétendons ... que la perception réfléchie est un circuit, où tous les éléments, y compris l'objet perçu lui-même, se tiennent en état de tension mutuelle ... un acte d'attention implique une telle solidarité entre l'esprit et son objet, c'est un circuit si bien fermé, qu'on ne saurait passer à des états de concentration supérieure sans créer de toute pièce autant de circuits nouveaux qui enveloppent le premier, et qui n'ont de commun entre eux que l'objet aperçu".
12. Confront with Bergson (1896: 115, my transl.): "The progress of attention has the effect of creating anew, not only the perceived object, but also the increasingly vast virtual systems to which it can be attached" [Le progrès de l'attention a pour effet de créer à nouveau, non seulement l'objet perçu, mais les systèmes virtuels de plus en plus vastes auxquels il peut se rattacher].
13. Confront with Whitehead: "Everything is positively somewhere in actuality, and in potency everywhere" (1929: 40). Quantum non-locality is also a thriving research area in contemporary physics, where similar insights can be found. Quantum superposition can be called 'virtual'.
14. The American mathematician Louis H. Kauffman (n.d.) has scrutinised George Spencer Brown's 'mark' notation, highlighting a similar duality: "The mark has a double carry of meaning. It can be seen as an operator, transforming the state on its inside to a different state on its outside, and it can be seen as the name of the marked state". (7) Operator and operand can only be distinguished contextually.
15. "There are always resonances between two systems having recurrence" (Thom 1975: 131). This appears to be almost a basic universal law of *syncing* (Strogatz 2003). The importance of syncing in social life can hardly be underestimated, although there is no space here to expand significantly on this matter.
16. An anonymous review of the paper raised the important question concerning the limit between deformation and the emergence of a new form. In Thom's (1988) schematism, a general reset of form (which he also calls 'generalised catastrophe') implies the co-presence of more pregnancies, whereby a change in the boundary conditions of a system is attained. I have expanded on the importance of boundary conditions in another paper (Brighenti 2026).
17. Here, I suggest to interpret 'intention' as the *signature* of the structure itself.
18. The existence of an object depends on an observer who can stand in front of it. Such a privileged frontal position is not afforded by topological manifolds, such as the Valov braids we are considering. There is no obvious way to 'see' society. Nonetheless, objectivity plays an important role: see more below for interpretation of the object as singularity.
19. Deleuze and Guattari explain extensively the rich ethological manifestations of territories. For an attempt at translating some of these ideas into sociology, see Brighenti (2010).
20. Some confusion may be engendered by Simondon's terminology: for instance, the pre-individual environment is called 'nature' by Simondon. However, it may as well be called 'society', or any other such term. What matters, it to consider it as the negative correlate of the operation of individuation. Similarly, Simondon dubs 'collective' the trans-individual social condition. However, the term is at the polar opposite of the Durkheimian meaning: the trans-individual is distinctively *not* what we would associate with a collection of individuals, because the individuals are not there in the transindividual phase of being. For this reason, elsewhere I have proposed to spell the transindividual 'transdividual'.
21. Original text: "...l'émotion est potentiel qui se découvre comme signification en se structurant dans l'individuation du collectif ... comme un conflit entre la réalité préindividuelle et la réalité individuée dans le sujet ... [Elle] n'est pas en réalité désorganisation du sujet, mais amorce d'une structuration nouvelle qui ne pourra se stabiliser que dans la découverte du collectif".
22. Again, Simmel was among the first authors to theorise that society (which he called *Wechselwirkung*) exists as a gradual phenomenon: there is *more or less* society, rather than a demarcation of society vs non-society.
23. One can also read Deleuze's theory of difference as placing it at the core of every repetitive process.

24. That a ‘third principle’ might be needed, is an idea that occurs *passim* also throughout Thom’s theory of morphogenesis. In a particularly revealing passage, Thom advances the hypothesis that *life* may be considered as a third type of ‘substance’ besides space and idea (namely, the two Cartesian categories of *pensée et étendue*) (Thom 1982: 614).
25. At the limit, *oblivion* itself is to be counted as one such ‘eternal’ (i.e. a-temporal) motif. But is oblivion really part of the manifold? This question calls for a more extensive investigation that is not possible to pursue here.
26. We are dealing here with a Spinozist, ‘experimental’ type of eternity: “*At nihilominus sentimus, experimurque, nos æternos esse...*” [Yet nonetheless we feel and experience that we are eternal...] (Spinoza 1665: §V, XXIII).
27. Simmel’s dissatisfaction with dichotomy is also evidenced, perhaps more anecdotally, in one of his reported sayings: ‘There are too few categories, just as there are too few sexes’.
28. The notion of *individuelle Gesetz* is devised by Simmel (2010[1918]: §IV), who describes it as “the centrality of life itself, unfolding as obligation”. Simmel opened up an alternative to Kant’s view on law as universal and indifferent to its deployments. The shift from *is* to *ought* (anathema to Humel!) is one of the best kept secrets in Simmel’s work. The present essay does not claim to have cracked it, but it can be said to encircle the same theme.

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