

# 01 - Post-Relational Agency: The being and the becoming of... things"

Mariana Emauz Valdetaro

01 April 2025

## Table of contents

<b>1</b>	<b>Abstract</b>	<b>1</b>
<b>2</b>	<b>Introduction</b>	<b>2</b>
<b>3</b>	<b>Agency as something allowing to effect, affect, be effected, and affected</b>	<b>3</b>
3.1	Morphology and Agential Potential . . . . .	3
3.2	Identity As a Process, Existing As a Temporal Pattern . . . . .	4
3.3	Boundaries as Relational Interfaces . . . . .	5
<b>4</b>	<b>Nested Affecting Across Scales</b>	<b>6</b>
<b>5</b>	<b>Relational Agency</b>	<b>6</b>
<b>6</b>	<b>The Nature of Becoming</b>	<b>7</b>
<b>7</b>	<b>The Co-Constitution of Agency, Identity, Boundaries, and Relations</b>	<b>8</b>
<b>8</b>	<b>References</b>	<b>9</b>

## 1 Abstract

This article relates the first part of my inquiry on agency, in which I reviewed it from different lenses such as linguistic, political, and bio-chemical. Given my most recent dwellings into the necessary clarifications what I previously meant by "thing" and "relation", a revision is in order. Upon it, I will also revise the proposal pinning agency as a property of things, to something around the lines of a capacity, or current. Naturally, I'll dissect those terms, and from identity, boundaries and the means and ways of relating, this note also presents a semi-formal attempt to express its recursive nature, setting the stage for the next step where I'll try to simulate the generative mechanisms

identified.

## 2 Introduction

The polysemic nature of “agency” across scientific disciplines may not reflect ambiguity, but actually a sign-proximity or complementary views. When addressing matters concerning agency, unavoidable efforts toward formal and operable understanding of identity, boundaries, selves and their quantities. This, of course, if one entertain that notion that things in the universe relate. If allowed by design, chance, or from now on, engineered for such. Additionally, agents are everywhere, and in the agent discussion there seem to be no consensus for their nature, from chemical catalysts to institutions. Previously I asserted, for this same reason, that we could simplify from “agents to things”, as it would serve this study enormously well given I’ve been looking for the generals of agency. I’ve repeated this, but clarity in abstraction is more than an exercise in discipline, as it seems a form of symbolic compression, simplifying, yet not reducing.

At stake is a possible demonstration that agency is a linguistic pointer to an overall capacity to affect and be affected. A relational dynamic that operates through processual identity, its boundaries, which the formation of both, needs to be formally addressed, describing and predicting how interactions are mediated. Across scales, where things are vehicles for both, principals and agents, causal relations of generative potential (hypothetically) we need to approach this thoroughly, systematically, and anchor the examples and expression with experimental evidence.

Why? Stated and widely accepted is agency as a capacity or property that agents possess, creating immediate problems: what makes something an agent? Why some have rights and responsibilities, leverage, and others considered as such without the benefit of consideration? The answer typically involves circular reasoning; agents are things that have agency, and agency is what agents have, or agency in context X assumed only agents of context X. This circularity and fragmentation dissolves if view this conundrum from a far; put simply agency as the way of things to effect, affect and be effected and affected.

Chemicals, proteins, cells, organisms, institutions, markets. Driving change, changing, composing, being composed, belonging, allowing for and becoming.

From my current understanding the ubiquity of agency across scales, does not seem to follow any imposition we are making upon the world but rather as something we as a species seem to have a

degree of competency in recognising, in various manifestations. While debatable, and objectable, I haven't found enough resistance in literature to discourage an exploration of agency via energy transfer.

As such, circling back to the thesis that all things that exist, or we have observed, directly or indirectly, to some degree, this stands as we don't have, for now, evidence otherwise; then defining what is meant by things, and what makes them distinct, allowing said degrees of relation, requires addressing identity, boundary and relations in spatial and temporal dimensions.

This exercise seems to have major benefits: if only a subset of things in the universe relate, by opposition of a general feature of universe, then learning why and how would be rather informative. The nature of the medium in which we exist, in either scenario, should be in theory measurable, regardless of its nature, though not necessarily constant, and it should be scale-appropriate, I intuit, concerning the space where specific things find cohesion.

### **3 Agency as something allowing to effect, affect, be effected, and affected**

#### **3.1 Morphology and Agential Potential**

If we consider a protein's "agential potential", this would be the domain and range of possible states, inward, outward, which implies a permeability both ways.

Morphology, the form, structure, or pattern of a thing, seems to be somewhat self-informing of how will something relate to what's not itself. Simultaneously, its identity, expresses how it related to itself. A protein's three dimensional structure determines what it can bind to and what reactions it can catalyse. A cell's membrane determines what can enter and exit. An institution's organisational structure, determines how it operated, regulating departments, processes with potential to optimise each level of the structure.

This notion of agential potential includes both positive and negative expressions; various sources of influence may reflect in to enhanced or diminished states.

### 3.2 Identity As a Process, Existing As a Temporal Pattern

Identity, not as a fixed and independent configuration, but a non-linear process, leading to a pattern appearing to us persisting in space and time. Can we address the question of “*how can something remain the same while changing?*”

The traditional substance approach treats identity as self, a thing is what it is by virtue of possessing certain intrinsic properties. This tautological statement does not explain how a thing can maintain identity while undergoing constant molecular turnover, developmental transformation, or environmental adaptation. It does not explain how thing can be, belong and compose. Aiming to address identity meaningfully, I first reviews the surprising and extensive body of work on “thingness”, revealed insightful notions helping the proposal and formalism for a “self” not merely as the limit

$$\text{Id}(X) = \lim_{\rightarrow \text{interactions}} X_t$$

but as a structured cospan reconciling intrinsic and extrinsic phase-states:

$$X_t \xrightarrow{\alpha} I \xleftarrow{\beta} E_{t+1}$$

where  $X_t$  is the system at time  $t$ ,  $I$  encodes intrinsic organizational states, and  $E_{t+1}$  is the extrinsic phase-state that constitutes what is other than  $t + 1$ . Identity persists if there exists a retract  $r : E_{t+1} \rightarrow I$  such that  $r \circ \beta = \text{id}_I$ , anchoring the thing in spatiotemporal dimensions.

Human cells replace their entire protein content every 7-10 days, yet maintain recognizable identity. This seems possible because identity is not material composition only, but allowed by it. Proteins within the same functional complex coordinate their degradation and synthesis, maintaining relational patterns even as individual molecules are replaced. This is why we formalise cellular identity  $I(t)$  as the time-varying coherence of an assembly whose parts are continually replaced:

$$I(t) = \frac{1}{N} \sum_{k=1}^N \exp[-k_{\text{deg},k} \cdot t]$$

where  $k_{\text{deg},k}$  is the degradation constant for protein  $k$ . Identity is the integral of these coordinated turnover processes, a temporal pattern of affecting and being affected that persists through mate-

rial change, but not exclusively. The membrane of a cell is what makes it a cell, *no membrane, no cell*, and the affordance of being dissolves into the environment. In fuzzy cases such as a cloud or a forest, the boundary-identity construction, and the premise of it being an interface operating for internal and external relations, challenges strict delineations, and the above notion of an event at a limit.

### 3.3 Boundaries as Relational Interfaces

A forest maintains its identity not through the persistence of individual trees but through patterns of growth, death, and regeneration, networks of roots, and other things that compose and belong to the bio-region. An institution maintains its identity not through the persistence of individual members but through patterns of role occupancy, rule enforcement, and resource allocation.

Boundaries are not barriers but relational interfaces that mediate how things affect each other. They are neither inside nor outside but the dynamic interface through which affecting occurs.

Boundaries ( $B_S$ ) are thus not passive containers but phase-state mediators, filtering and conditioning relations ( $R_S$ ); fuzzy and context-related. Identity and boundary are fundamentally co-constitutive: identity is a contextually coherent, transient state that develops from the dynamic interplay between a system's intrinsic states, and extrinsic events, realised through structured cospans and stabilized via retraction conditions. Boundaries are not static lines or mere containers, but active, context-dependent phase-state mediators that filter, enable, and reshape the very identity allowing interactions that constitute identity.

In planarian regeneration, bioelectric patterns establish morphological boundaries within hours of injury. These boundaries are not pre-existing structures but dynamic patterns of membrane potential that determine head-tail polarity. The boundary is constituted by the differential capacity of cells to affect each other through gap junction communication.

We previously defined boundary dynamics modeled as (todo: data for the example, levin):

$$B(t) = \sigma(\Delta V_{\text{mem}}(t))$$

where  $\sigma$  represents the sigmoidal conductance of gap junction networks. Quantitative measurements demonstrate that anterior blastemas maintain depolarized membrane voltage (-25 to -35

mV) relative to posterior blastemas (-40 to -50 mV) throughout the first 48 hours of regeneration.

Experimental manipulation seems to provide critical validation for the hypothesis, where external and unforeseen intervention depolarises tissue during the first 3 hours of regeneration which completely alters morphogenetic outcomes, producing double-headed phenotypes despite washout of depolarising agents. This proves that boundaries function as **enabling constraints** that actively shape relational possibilities rather than merely containing things.

## 4 Nested Affecting Across Scales

Agency operates through nested patterns of affecting across multiple scales. Molecular affects enable cellular affects, which enable tissue affects, which enable organismal affects. Each scale has its own characteristic morphologies, boundaries, and temporal rhythms, but these scales are not independent; they are nested patterns of affecting.

Considering the temporal dimensions, if each process exhibits **temporal side of agency**, the capacity to maintain coherent organization across time through selective interaction with its medium-phase-space.

**Nested processes** where faster dynamics enable slower dynamics while slower dynamics constrain faster dynamics. Protein turnover rates within regenerating planarian tissues are actively modulated by bioelectric fields that coordinate morphogenetic outcomes. Planarian regenerative capacity reflects evolutionary processes that have shaped developmental genetic networks over geological timescales, creating **temporal nesting** where each organizational level both constrains and enables other levels.

The nesting is not hierarchical but recursive. Higher-scale patterns constrain lower-scale affects, while lower-scale affects enable higher-scale patterns. This recursive causation creates **scalar coupling**: the coordination of affecting across scales through boundary-mediated interactions. The question of course is why?

## 5 Relational Agency

The very basic idea is that agent is an acting influence. Naturally, we may view this process producing an action, effectuating a trajectory into the future and affecting the surroundings and the agent

itself. This is quite familiar with a general understanding of what a relation is. Relation symbols in mathematics are a frame of reference of something with something else, in a relational two or more things are required, then we have different and rather specific ways of relating things, arranging things into meaning, or making-sense of things. If created by resemblance or convention, a relation that something has to itself, to be meaningful, the selves had to change in any given way such as the first self and the second to be mapped by this relation. What strikes me as outrageous here is that this is so obvious in its resembles with recursion and generative process that surely someone else has to have had formalise this insight.

If entities exist because relational patterns, which generate other relational patterns, given its agential potential, what is agency, and was there a beginning, a generative singularity?

Traditional metaphysics treats relations as secondary to relata; things first exist independently and then enter into relationships with other things. A relational ontology for the universe reverses this priority, and relations become ontologically more fundamental than the entities themselves.

But what if both the substance and the relation were one pattern, what would the geometry of a medium producing these patterns?

A doodle to later inform myself of the idea goes as follows:

$$\text{Reality} = \Sigma \partial(\text{interactions})$$

where boundaries ( $\partial$ ) emerge from interactions rather than preceding them. This formulation suggests that what we experience reality as the collection of “things” as stable patterns in the field of relation; temporary stabilities in ongoing but patterned change.

## 6 The Nature of Becoming

The processual understanding of identity and boundaries converges onto an understanding of what we might call the nature of **becoming**. Becoming is not change happening to static things but the fundamental character of things themselves. Things do not become; things ARE becoming; other things?

Since Parmenides and Heraclitus, the tension between being and becoming has reigned debates,

I wonder if we have to decide at all. Being-as-becoming implies a understanding, explaining and predicting the the patterning of a phase-state, or the achievement, within frames of temporary coherence that happen through ongoing relational engagement.

What are the means for such events in what we call the universe, why does this seem to prevail amidst all change, intentional, causal, random, arbitrary, deliberate and senseless?

Is agency coining the act of harnessing it, or is that within the agential potential of thing to achieve or not?

Grappling with the forces that drive change, we venture onto these depths not by intellectual vanity but as a response to empirical discoveries across multiple inquiry domains, and by the necessity and usefulness of answering this question, which could make of senseless things into something else. This transition yields to what Alfred North Whitehead termed a philosophy of organism, where reality is constituted by processes “all the way down” rather than by static substances that happen to interact. Almost as if materialism could be challenged not by discourse alone but by logic. Instead of treating processes as modifications that happen to things, for a reason that is unknown to us, equating that things may be “transient patterns” which at scale produce a coherent effect, a stability, seems to be better aligned with evidence than the other way around. The very fact that we can bundle material together implies the necessity of a deeper explanation, if material, some of it agential, could not relate, would it be agential at all, or all material that relates is agential?

## **7 The Co-Constitution of Agency, Identity, Boundaries, and Relations**

I once had a dream, I saw a system, with a structural foundations similar to bones tinted with a cold blue hue. along the system a glowing region changed cyclically, givin the impression of a traveling node. As it journed through the system, certain parts of it seem to be reeinforced somehow by the number of times this glowing node visited. Along the path, these checkpoints were distributed and visited and revised, and in my dream I remember thinking “Oh, interesting, this is a transcription process, and an embedded safe-guard agaist information loss, perhaps this is how memories are made and encoded”. Agency, identity, boundaries, and relations are co-constitutive aspects of the same dynamic process, where agency allows becoming and being, then identity, boundaries, and relations are a provider of phase-state coherence through which things affect each other, ultimately generating other things. I became hung up on this generative effect, by affectation. Why and how



would a medium allow for it? Identity constrains agency by providing processual patterns that persist through affecting. Boundaries mediate agency by providing interfaces through which affecting occurs. Relations coordinate agency by providing scale-spanning patterns that nest affects, and consequences... are the causal networks we can't yet draw part of the very medium allowing relations?

A relational ontology does not seem to suffice, we may be trying to grasp something with processual, energetic, and relational properties, where via and because of phase-state mediators, coherence enables more coherence. We're tracking with notions that tie not only past states to future ones, but also notions of unfolding, discussions that surround Aristotelian efficient causation and the Daoist shi (時) as the propensity of situations to unfold, we relate causation and unfolding as describing something that has been said to weave spatiotemporal states.

This co-constitution recurrent happenings, may be at the core of why there seems to be a cause and an effect in the first place. Putting cause-and-effect as an ontological precedent to material, actually seems to include something that allows the becoming or even becomes because of this transfer between past and future. Almost as if whatever travels between and because of phase-states is the very source of reality. Perceiving these events at the scales available to us, may be what has led us to signal "agency" and "agents" in such varied contexts and diverse manifestations. It is not that everything "has" agency as a property, but that everything exists through patterns of affecting and being affected. Agency seems more likely to be a sign of something more fundamental, a dynamic through which everything was, is, and will be.

## 8 References

- Barabási, Albert-László. 2016. *Network Science*. Cambridge: Cambridge University Press.
- Carli, Rossella. 2016. "Relational Ontology in Nietzsche: An Introduction." *Parrhesia* 26: 85-104.
- Dupré, John, and Daniel J. Nicholson. 2018. "A Manifesto for a Processual Philosophy of Biology." In *Everything Flows: Towards a Processual Philosophy of Biology*, edited by Daniel J. Nicholson and John Dupré, 3-45. Oxford: Oxford University Press.
- Graham, Daniel W. 2016. "Heraclitus' Conceptions of Flux, Fire, and Material Persistence." In *Continuants: Their Activity, Their Being, and Their Identity*, 112-134. Oxford: Oxford University Press.

Juarrero, Alicia. 2023. *Context Changes Everything: How Constraints Create Coherence*. Cambridge, MA: MIT Press.

Levin, Michael. 2021. "Bioelectric Networks: The Cognitive Glue Enabling Evolutionary Scaling from Physics to Mind." *Animal Cognition* 24(5): 865-891.

Rogers, Timothy M. 2024. "How is a Relational Formal Ontology Relational? An Exploration of the Semiotic Logic of Agency in Physics, Mathematics, and Natural Philosophy." *PhilSci Archive*. <https://philsci-archive.pitt.edu/id/eprint/24844>.

Singh, Rajesh, and Sarah Edwards. 2007. "Emergence and Identity." *Journal of Emergent Publications* 2(3): 167-189.

Walker, Sara I., et al. 2017. "The Algorithmic Origins of Life." *Journal of the Royal Society Interface* 14(129): 20160358.

West, Geoffrey B. 2017. *Scale: The Universal Laws of Growth, Innovation, Sustainability, and the Pace of Life in Organisms, Cities, Economies, and Companies*. New York: Penguin Press.

Whitehead, Alfred North. 1929. *Process and Reality: An Essay in Cosmology*. New York: Macmillan.