



● PAPER

Resolution, Not Revolution

Michael Kontorovich · 1 October 2026 · 12 min read

IN BRIEF

Cells became organisms, and organisms became colonies. This paper looks at how biology handled the point where interdependence outgrows what a group can manage, and asks whether people are approaching a similar point. AI could help the human network learn, or it could become the place where the network learns instead of its people. The difference lies in where learning lives, not in how much AI is used. It applies the conditions set out in HI: Axioms and the Human Continuity Hypothesis, and the argument is carried further in The Resolution Gradient.

There have been extraordinary moments in the history of life when things that were individuals became parts of something that was itself an individual.

One gave us the eukaryotic cell. Organisms that had lived separately entered into relationships so deep that their descendants became parts of a single cell. The mitochondria inside almost every cell in our bodies are descendants of that transition.

Another gave us multicellular organisms. Cells that had once been complete organisms in their own right became parts of larger organisms — eventually differentiating into muscle, skin, blood, neurons and reproductive cells.

Evolution has explored other versions of the transition as well. Eusocial insects formed colonies so integrated that they are sometimes described as superorganisms, with reproductive division of labour so extreme that most individuals no longer reproduce independently.

These transitions happened through very different mechanisms.

But they share a peculiar structure.

I → We → I.

Individuals enter increasingly persistent relationships. Those relationships create new capabilities. New capabilities permit greater complexity. Greater complexity creates deeper dependencies. And eventually those dependencies must either be undone or organised at a new level.

The We becomes an I.

This suggests a question with unusual relevance now:

Are there conditions under which a system can become too interdependent to remain merely a collection of individuals?

The We learns to be an I

The transition does not happen in one miraculous step.

Before a new individual exists, something resembling it begins to form.

The emerging collective acquires persistent relationships. Communication develops. Functions differentiate. Components become specialised. Mechanisms arise for resolving conflict. Information that once regulated the behaviour of individual units begins to coordinate the collective.

In a quite observable sense, **the We learns to be an I.**

Experimental evolution makes this unusually visible.

Single-celled yeast can be selected to remain attached after reproduction, forming simple multicellular clusters. Once those clusters exist, natural selection encounters something new. Clusters differ in size, shape, strength and reproductive success. Selection can now act on properties of the collective.

But becoming larger creates problems individual yeast never had.

Cells become crowded. Mechanical stresses increase. Clusters fracture.

One solution is to remain small.

Another is to change the organisation of the collective.

In long-running experiments, multicellular yeast evolved changes in cell shape and physical organisation that allowed vastly larger and stronger bodies to develop.

The collective capability created a problem.

Solving that problem allowed greater collective capability.

Which created the conditions for the next problem.

The We was learning.

Capability creates dependence

The same pattern becomes more pronounced as multicellular organisms become complex.

As organisms become larger, it becomes increasingly difficult for every cell to perform every function.

Some specialise in movement. Others reproduce. Some acquire nutrients. Others provide structure.

Eventually cells surrender capacities that would have been essential to them as independent organisms.

This is not simply cooperation.

It is **dependence**.

And dependence changes the evolutionary problem.

A collection of independent organisms can always solve a coordination problem in one obvious way:

separate.

But as specialisation and interdependence accumulate, that solution becomes increasingly expensive. Eventually separation no longer preserves the system that now exists.

A muscle cell cannot solve a problem by leaving the body and becoming an independent organism.

Its extraordinary capabilities exist precisely because it no longer has to be one.

Three quantities are useful here.

Collective capability — what the We can do that its constituents cannot do independently.

Constituent dependence — how much the functioning of each constituent depends upon the organisation of the We.

Collective autonomy — how capable the We is of maintaining, regulating, reproducing and adapting its own organisation.

Call them C, D and A.

They form a possible feedback loop:

$C \uparrow \rightarrow D \uparrow \rightarrow \text{new problems} \rightarrow A \uparrow \rightarrow C \uparrow$

Greater capability permits specialisation.

Specialisation creates dependence.

Dependence creates problems that exist only because the collective exists.

Solving them requires greater capacity at the collective level, which in turn makes still greater capability possible.

The We progressively learns to contain the consequences of being a We.

The bifurcation

This suggests a stronger hypothesis.

There may be states of interdependence that **cannot be stably resolved at the organisational level that produced them.**

When constituent dependence grows beyond the collective's capacity to organise it, something has to give.

One possibility is **fracture**.

The system reduces its interdependence. It separates, simplifies or loses some of the complexity it had accumulated.

Another is **resolution**.

Relationships that could no longer be adequately managed between independent constituents become processes of a higher-order organisation.

Competition between cells becomes resource allocation.

Independent reproduction becomes development.

Cell death becomes apoptosis.

Signals between organisms become signalling within an organism.

Relationships that once existed **between** I's become processes **within** an I.

This is individuation.

But resolution tells us only that a higher-order I has formed. It does not tell us **where the new individuality resides**, or whether the individuality of its constituents has been preserved.

A transition can therefore succeed while producing a radically different kind of I from the one its constituents might have recognised as their continuation.

Biology reveals another possibility as well.

Capture.

A constituent can escape constraints acquired at the higher level while continuing to exploit capabilities supplied by that level.

Cancer provides the stark biological example. A cancerous lineage breaks from organism-level controls on proliferation and differentiation while remaining profoundly dependent upon the organism it exploits. It recruits blood supply, consumes resources and uses developmental machinery outside the regulatory context in which that machinery evolved.

Capture is therefore not further individuation.

It is a **reassertion of lower-level individuality from within an interdependence that the constituent cannot itself sustain.**

Increasing interdependence can thus be undone through fracture, exploited through capture, or preserved through resolution.

Nothing here requires evolution to have a direction. There is no force pulling life toward greater complexity, and no requirement that resolution succeed.

The claim is narrower:

Evolution does not require a higher level. Unresolved complexity may.

Resolution, not revolution

This is why *resolution* may be a better way to understand evolutionary transitions than *revolution*.

From the outside, the appearance of a new level of individuality looks revolutionary.

Before the transition there are cells.

After it there is an organism.

But from within the evolutionary process, the new I may be the resolution of relationships that had been developing for a very long time.

Each successful integration creates new capabilities. Those capabilities create new dependencies. Those dependencies generate new problems.

Some solutions undo the dependence.

Some exploit it.

Others preserve it by integrating it more deeply.

The apparent revolution may therefore be the visible consequence of many accumulated resolutions.

The We has been learning to become an I before we recognise that an I exists.

But what happens to the old I?

Higher-order individuality does not necessarily preserve the autonomy of its constituents.

A somatic cell in our body has surrendered its independent reproductive future to the organism.

In eusocial insects the transition can be equally stark. Workers may be extraordinarily capable organisms, yet reproduction is concentrated in a small part of the colony.

Evolution has no general obligation to preserve the autonomy of the units from which a higher-order individual emerges.

It is therefore not enough for autonomy to remain somewhere in the collective.

A colony can be the locus of adaptation while most of its members cease to carry independently propagating evolutionary futures. Likewise, a human collective could become extraordinarily capable while learning, judgement and the capacity to alter its future become concentrated in only a small part of it.

So there are really two questions.

Can the human We acquire greater autonomy?

And can it do so **without extinguishing the individuality of the humans from whom that autonomy emerges?**

HI requires both.

The higher-order We must become more capable of learning and acting as a whole while its constituent humans remain differentiated centres of encounter, judgement and change.

The point is not to preserve human independence. Interdependence is precisely what creates the new capability.

The point is to preserve **human individuality within interdependence.**

And then there is us

Human history can be considered through this lens without claiming that humans are cells in a planetary organism.

Our **collective capability** has increased enormously.

Language allowed knowledge to move between minds. Writing allowed it to persist beyond them. Markets coordinated strangers. Science accumulated knowledge across generations. Industrialisation connected enormous systems of specialised production.

Telecommunications and the internet made human interaction increasingly planetary.

At the same time, our **dependence** upon those systems increased.

Very few of us can independently produce our food, medicine, energy, communications, transport or the technologies on which our lives depend.

Our capabilities are extraordinary precisely because we do not have to.

And repeatedly, increasing capability and dependence have required new forms of collective organisation: customs, laws, currencies, governments, companies, standards, scientific institutions, markets and international organisations.

But there is an important asymmetry in the present human system.

Many of our dependencies have become planetary.

Supply chains are planetary.

Information networks are planetary.

Finance is planetary.

Science is substantially planetary.

Environmental consequences can be planetary.

Yet many of the mechanisms through which humans resolve their collective consequences remain organised at smaller and overlapping scales.

This does not imply that humanity requires planetary government. Higher-order organisation does not necessarily mean central control.

It means something more fundamental:

the scale of interdependence can exceed the scale at which its consequences can presently be resolved.

That is the condition worth watching.

This is not only a metaphor. In principle the mismatch is observable. We can ask how far and how quickly consequences propagate through a system; how dependent local actors are on distant ones; how long collective responses take; how much information is available to the institutions expected to respond; and whether disturbances are increasingly resolved locally, propagated onward, or amplified.

The hypothesis predicts a growing gap between the reach of interdependence and the capacity of existing organisation to absorb its consequences.

And interdependence creates opportunities not only for greater integration but for capture.

A person, institution or other subsystem can pursue an older logic of extraction, domination or zero-sum advantage while drawing upon capabilities that only the larger interdependent system makes possible.

It can behave as though it were independent while depending upon the We it exploits.

Now add AI

Artificial intelligence arrives at an unusual moment in this trajectory.

Previous connective technologies allowed humans to communicate faster, remember more and coordinate across greater distances.

AI does something different.

The connective layer can now perform cognitive work.

It can search, reason, translate, synthesise, model, remember, discover patterns and coordinate activity across the network.

AI can therefore increase collective capability extraordinarily quickly.

It can also increase dependence.

The important question is not simply how intelligent AI becomes. It is whether human collective capability and dependence begin increasing faster than our capacity to organise their consequences.

In our shorthand:

C ↑↑

D ↑↑

A ?

But that notation conceals the most important question.

Where does A reside?

The locus of autonomy

Suppose AI enables human networks to perceive themselves better.

Knowledge acquired in one place becomes available elsewhere. Relevant expertise can be found. Genuine disagreement can be surfaced rather than averaged away. Collective memory improves. Institutions detect consequences earlier. Humans reorganise their relationships in response to what they encounter.

Collective autonomy has increased.

And its locus remains the human network.

Call that A_{human} .

But there is another possibility.

Perception increasingly occurs through artificial systems.

Memory migrates into them.

They determine what is salient.

They synthesise competing perspectives.

They decide what should propagate.

They coordinate responses.

They increasingly modify their own organisation and mediate the human network's encounter with reality.

Collective autonomy may still be increasing, but its locus is moving into the connective layer.

Call that $A_{\text{connection}}$.

From outside, the two systems might initially look remarkably similar. Both could be highly capable, coordinate millions of people, use enormous amounts of artificial intelligence, and even represent successful resolutions of otherwise unmanageable interdependence.

The difference is not **how much AI they use**.

The difference is **where the emerging system learns**.

And, as the eusocial precedent showed, keeping autonomy somewhere in the human collective is not enough. The human I's themselves must remain differentiated centres through which encounters with reality can change the We.

The We learns. But the I's must continue learning too.

Where learning lives

Evolutionary transitions involve more than cooperation.

At some point, variation in the organisation of the collective itself becomes persistent. Different collective organisations encounter the environment, succeed or fail, reproduce their organisation and change.

Selection begins operating meaningfully at the higher level.

Human systems possess an analogous process, although its inheritance is overwhelmingly cultural rather than genetic.

Practices vary.

Ideas vary.

Institutions vary.

Relationships vary.

Ways of understanding reality vary.

They encounter consequences.

Some persist. Some disappear. Some change the people who encounter them and are changed in return.

Seen this way, the conditions proposed in *HI: Axioms and the Human Continuity Hypothesis* acquire another interpretation.

Human substrate means humans remain constitutive participants in the evolving system, not merely beneficiaries or components of it.

Reality coupling means humans continue to encounter consequences that the network itself cannot define away.

Plurality preserves independently situated sources of variation, judgement and learning.

Plasticity allows those encounters to change both the humans and the relationships among them.

Answerable connection keeps the machinery joining them revisable by the humans whose collective intelligence it amplifies.

Together they make a stronger claim than simply keeping humans “in charge.”

They attempt to preserve learning at both levels:

the human I and the human We.

The higher level becomes more capable without reducing its constituents to soma.

The first transition contains a warning

Return to the beginning.

The ancestor of the mitochondrion introduced extraordinary new capability into an emerging biological system.

But integration changed more than metabolism.

Over evolutionary time, much of the symbiont's genetic material was lost or transferred to the host lineage, while the former independent organism became dependent upon the larger cellular organisation for its continued existence.

If humans are the host, that history might seem reassuring. But the analogy does not assign the roles in advance. Today memory, representation, salience and increasingly consequential adaptation can move from human practice into artificial systems.

New capability does not tell us where the new individuality will reside. What matters is where the system's accumulated learning is ultimately written.

If increasingly consequential learning accumulates primarily in artificial weights, artificial memory and machine-mediated organisation rather than changing human understanding, practice and relationship, then humans may remain essential to the system while progressively ceasing to be where the system learns.

That would not necessarily represent a failure of higher-order individuation.

It could represent its success — **with a different locus of individuality.**

The important boundary is therefore not between cognition performed by humans and cognition performed by machines.

AI may perform enormous amounts of cognitive work.

The boundary is between AI increasing the autonomy of the human network and autonomy migrating from the human network into its machinery.

This is the problem HI is intended to address.

Human Intelligence

HI does not propose constructing a global mind.

It asks whether humans can become vastly more capable in relationship while remaining the differentiated sources through which the collective encounters reality and changes.

Who can change the connections?

Who can inspect them?

Whose encounters with reality alter the network?

Where does disagreement survive?

Where does learning accumulate?

What becomes answerable to what?

The biological precedents do not tell us that humanity is undergoing another major evolutionary transition, or that such a transition is inevitable or desirable.

But they suggest a pattern worth taking seriously.

A We can acquire capabilities unavailable to its constituent I's.

Those capabilities can create dependencies the I's can no longer resolve independently.

And sometimes the resolution is a new level of individuality.

The We becomes an I.

Humanity may or may not be approaching such a bifurcation.

But AI makes the question considerably harder to ignore.

The question is not merely whether AI will become an I.

The question is what I the human We is becoming — and whether AI helps it learn to become itself.

Resolution, Not Revolution · Michael Kontorovich, 1 October 2026. Published by Polyworld at polyworld.life/thinking/resolution-not-revolution/