The Self-Organisation of the Information Society 1: Self-Organisation in Real-World Systems

IN3 Research Seminar
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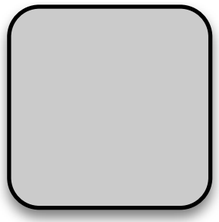
Contents

Transdisciplinarity

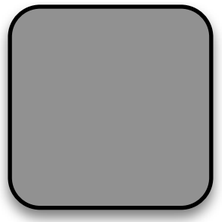
- Multi-, inter-, mono-, and transdisciplinarity (disjunctivism, disjunctivism with interaction, reductionism or projectivism, and integrativism)

Multidisciplinarity

Disjunctivism:
Internet research
as additive
function



engineering sciences
(e.g. Computer Science)



social and human sciences
(e.g. Communication Studies)

Interdisciplinarity

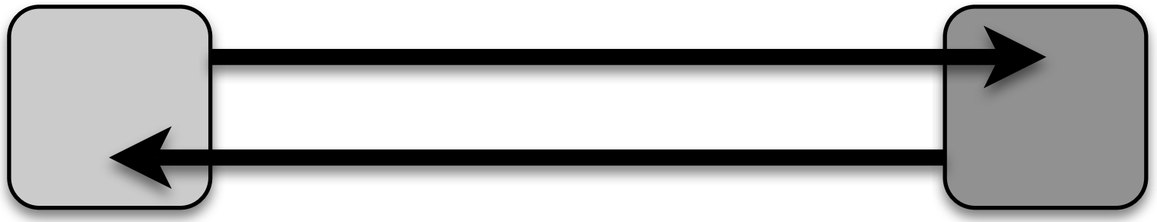
Disjunctivism with interaction:
Internet research
as ephemeral relationship

engineering sciences
(e.g. Computer Science)

social and human sciences
(e.g. Communication Studies)

Monodisciplinarity

Reductionism,
Projectivism:
Internet research
as subsumption
under one or
the other
discipline



engineering sciences
(e.g. Computer Science)

social and human sciences
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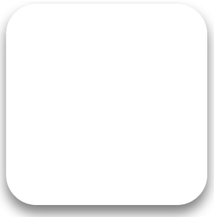
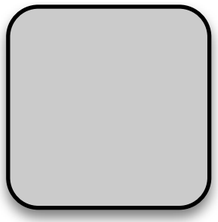
Transdisciplinarity

Integrativism:
Internet research
as transdiscipline





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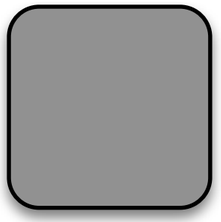

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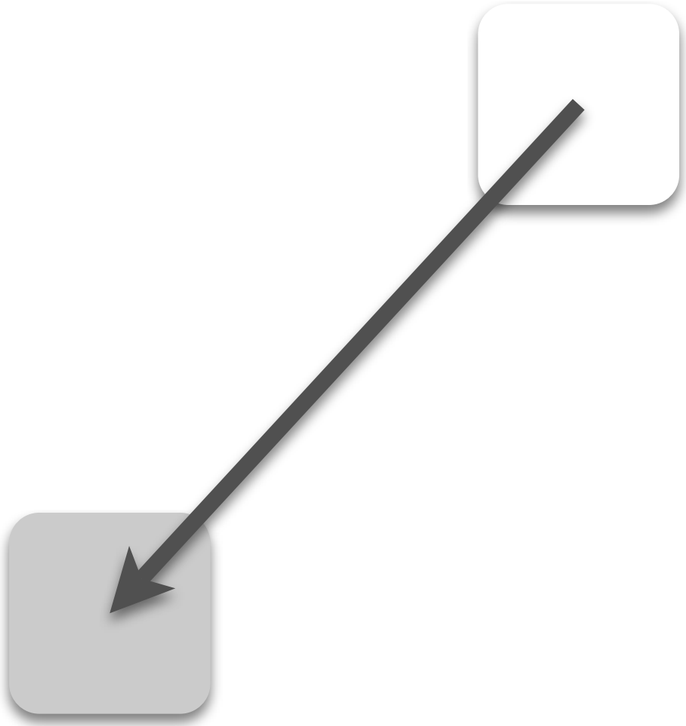
Transdisciplinarity

Integrativism:
Internet research
as transdiscipline



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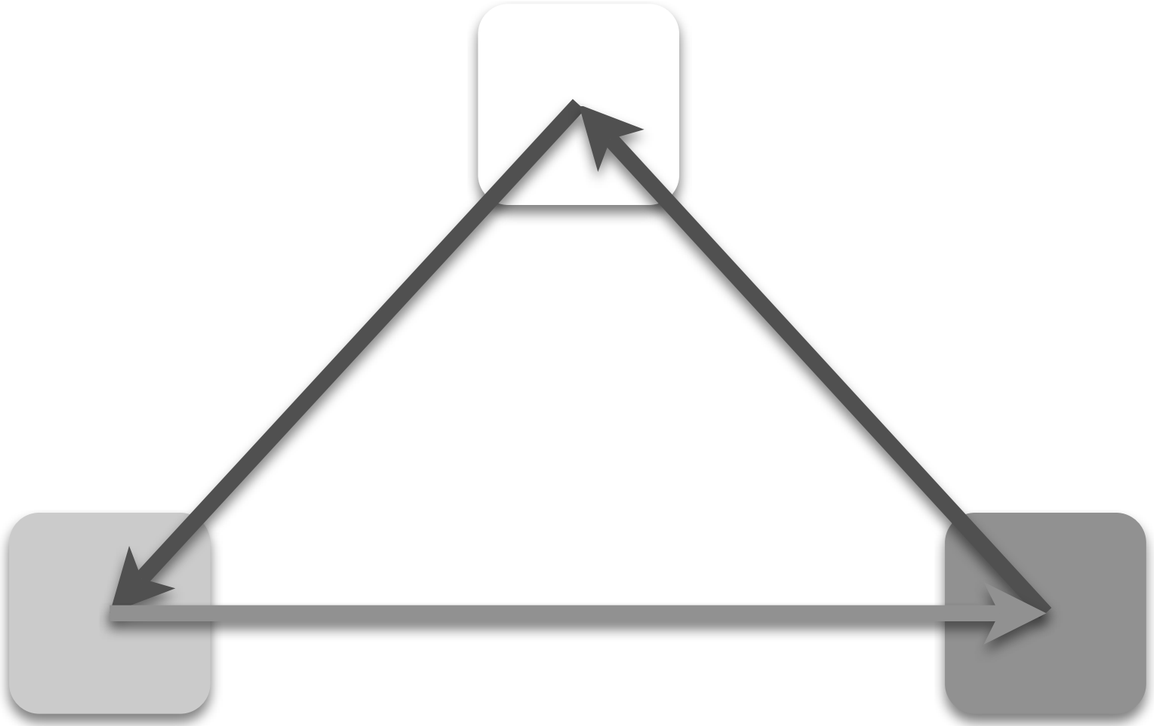

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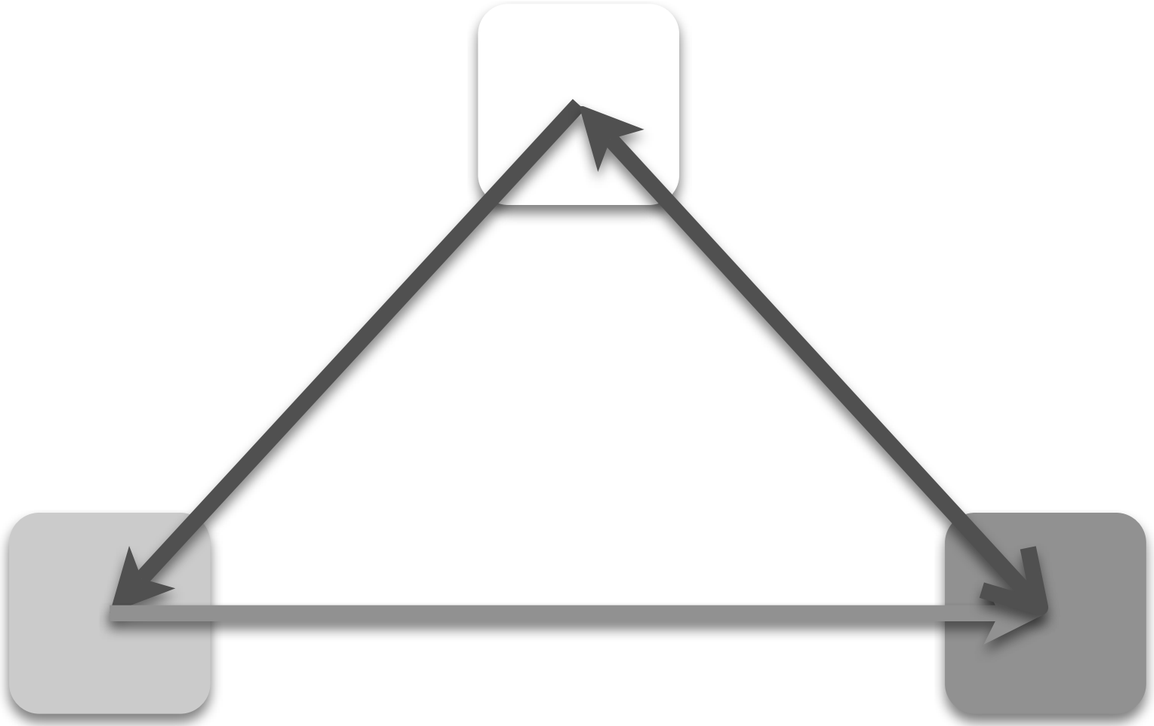

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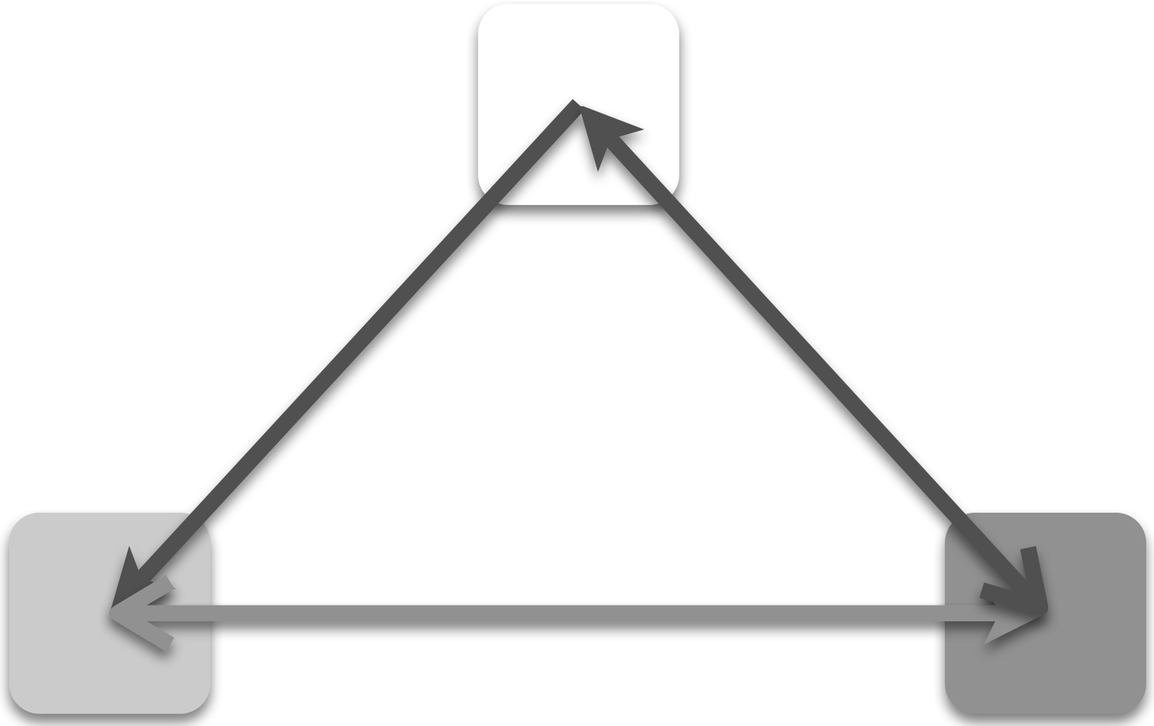

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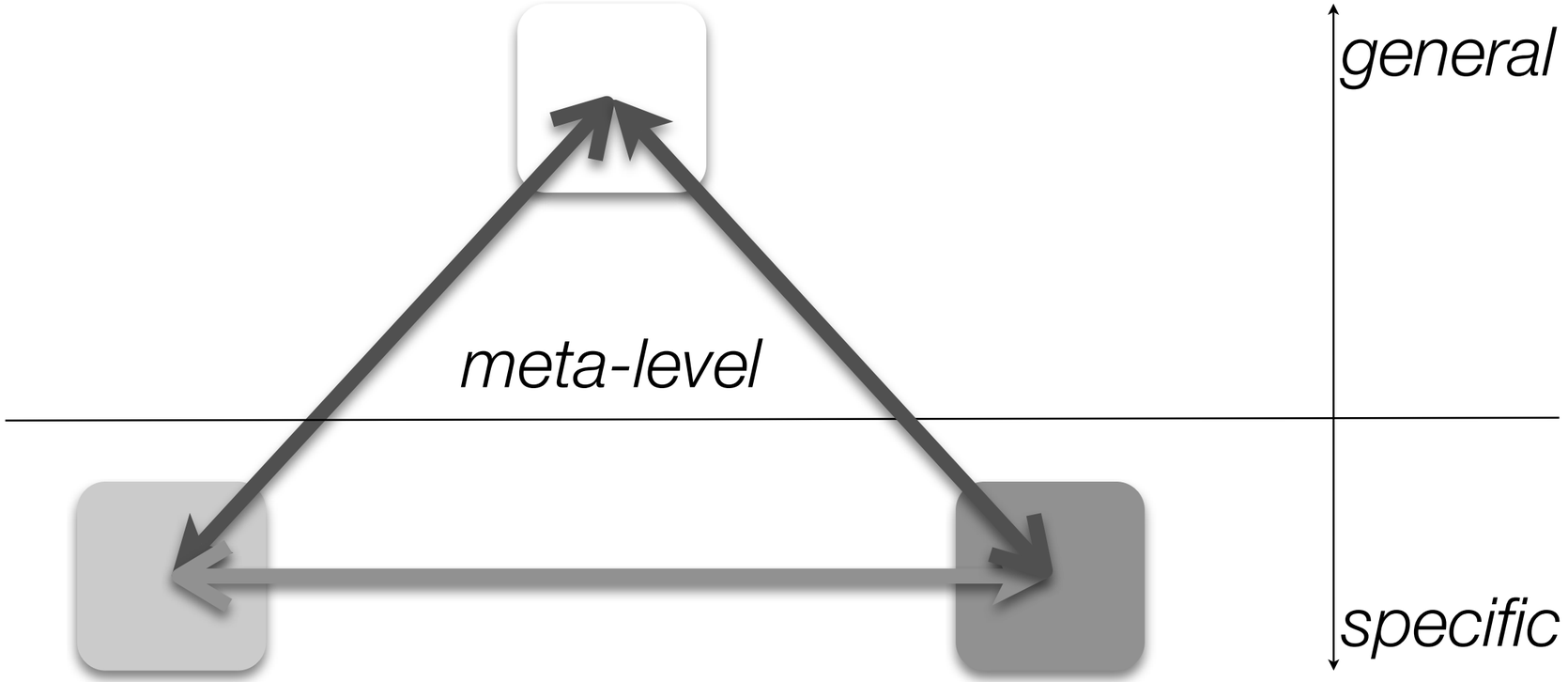

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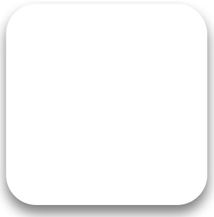
Transdisciplinarity

what is this third something?
science of complexity



– because complex problems of the information age need complex thinking!

Self-organisation. Evolutionary Systems Theory (EST)

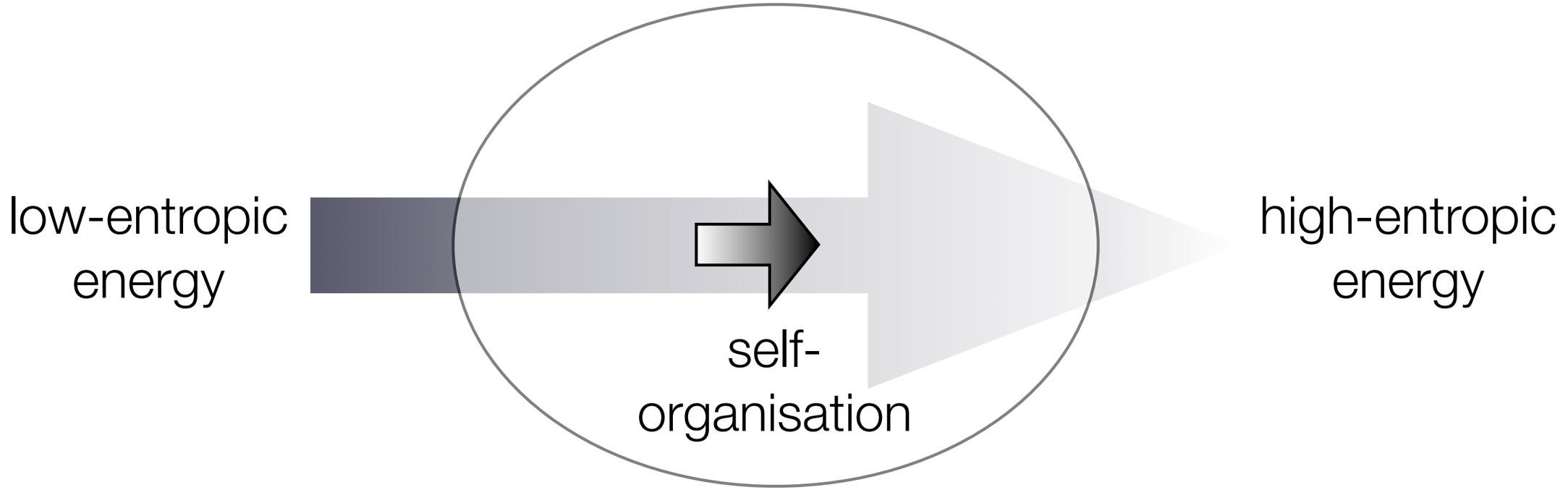
- Definition: basic dynamics, example, determinism, evolution, systemic hierarchy, stage model

- Irreproducibility, irreversibility and irreducibility, and unexplainability/ unpredictability

Definition

Self-organisation =def. spontaneous build-up/maintenance of order in matter (nature, real-world systems)

Definition: basic dynamics



Definition: example

Bénard convection cells:

in viscous liquids, beyond a critical temperature gradient microscopic conduction turns into macroscopic convection rolls (Ilya Prigogine)

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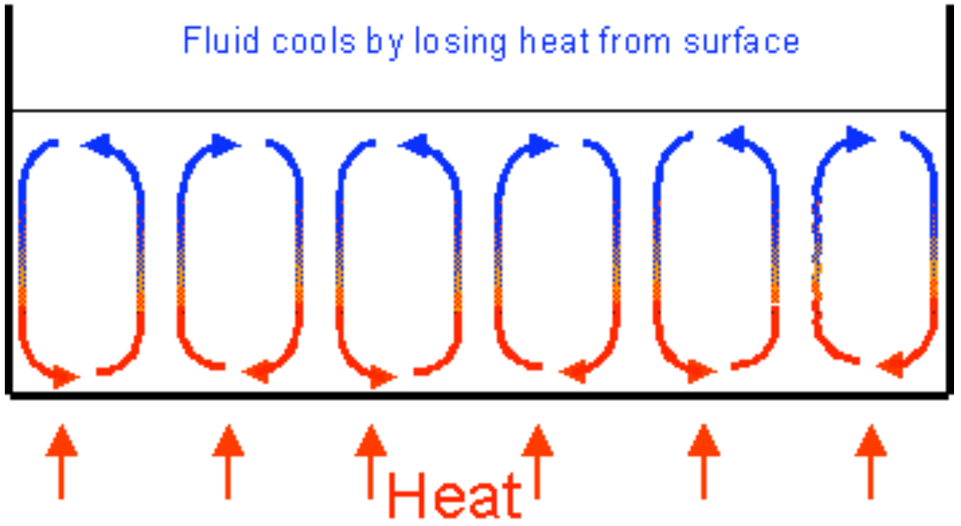
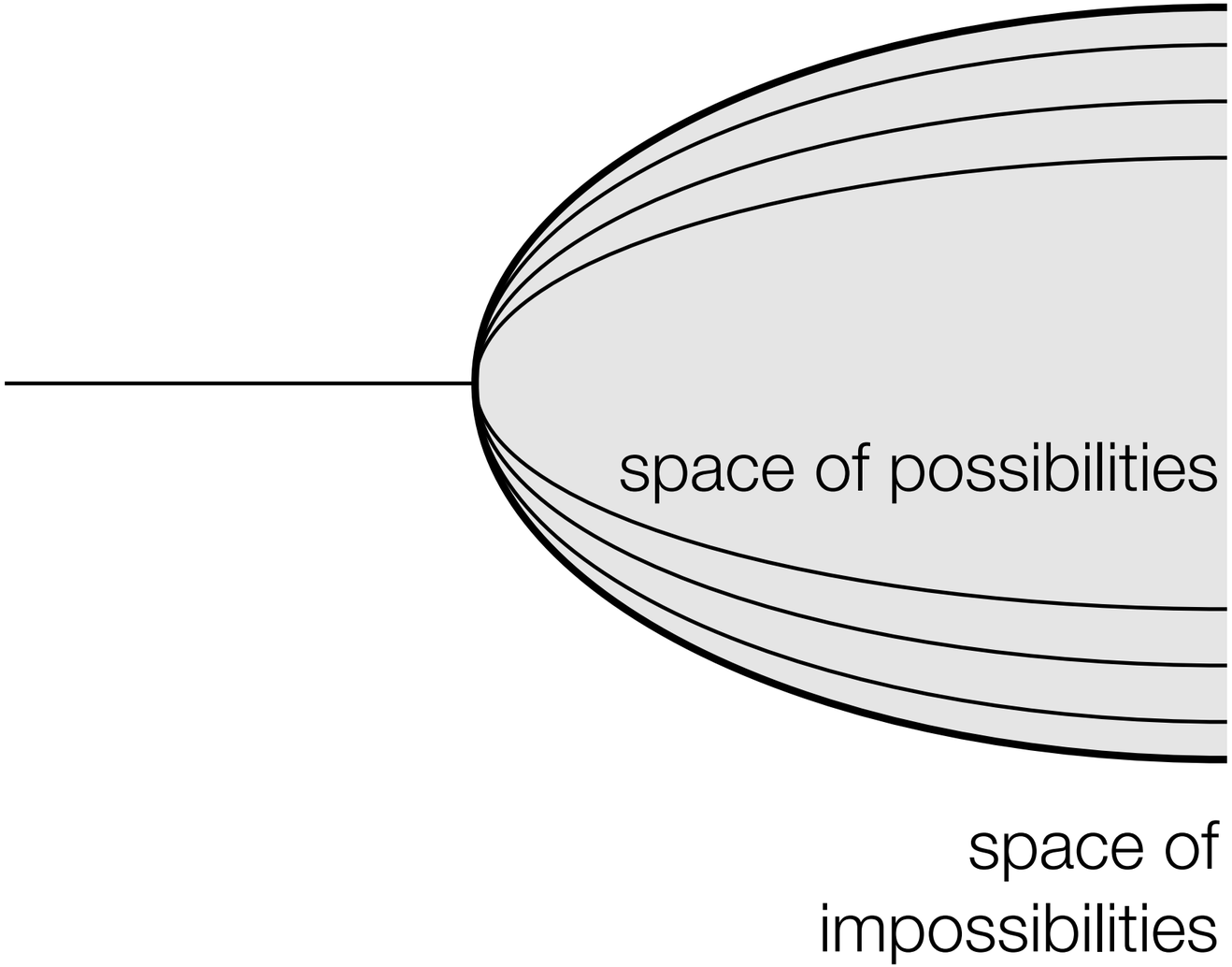
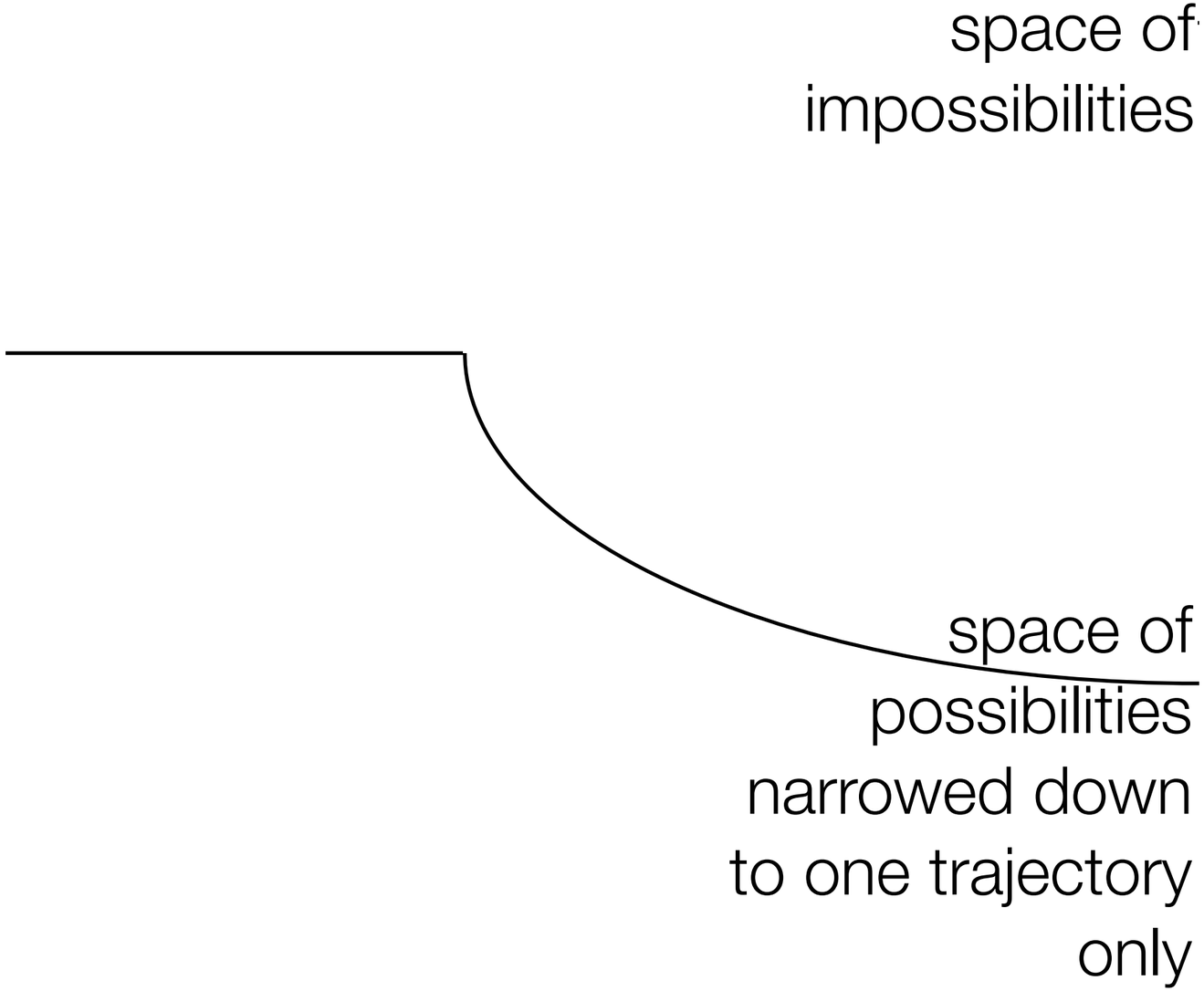


Convection cell
Warm, low density fluid rises
Cool, high density fluid sinks

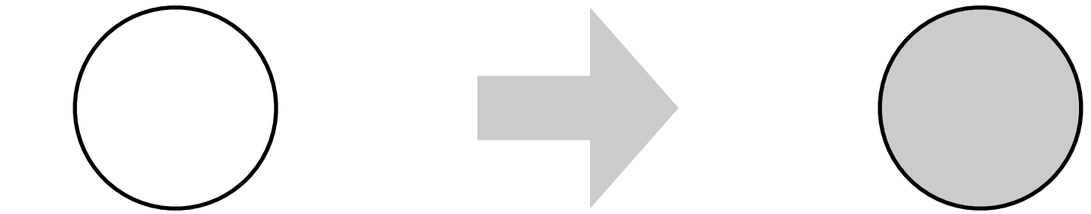
Definition: determinism



Definition: determinism



Definition: evolution

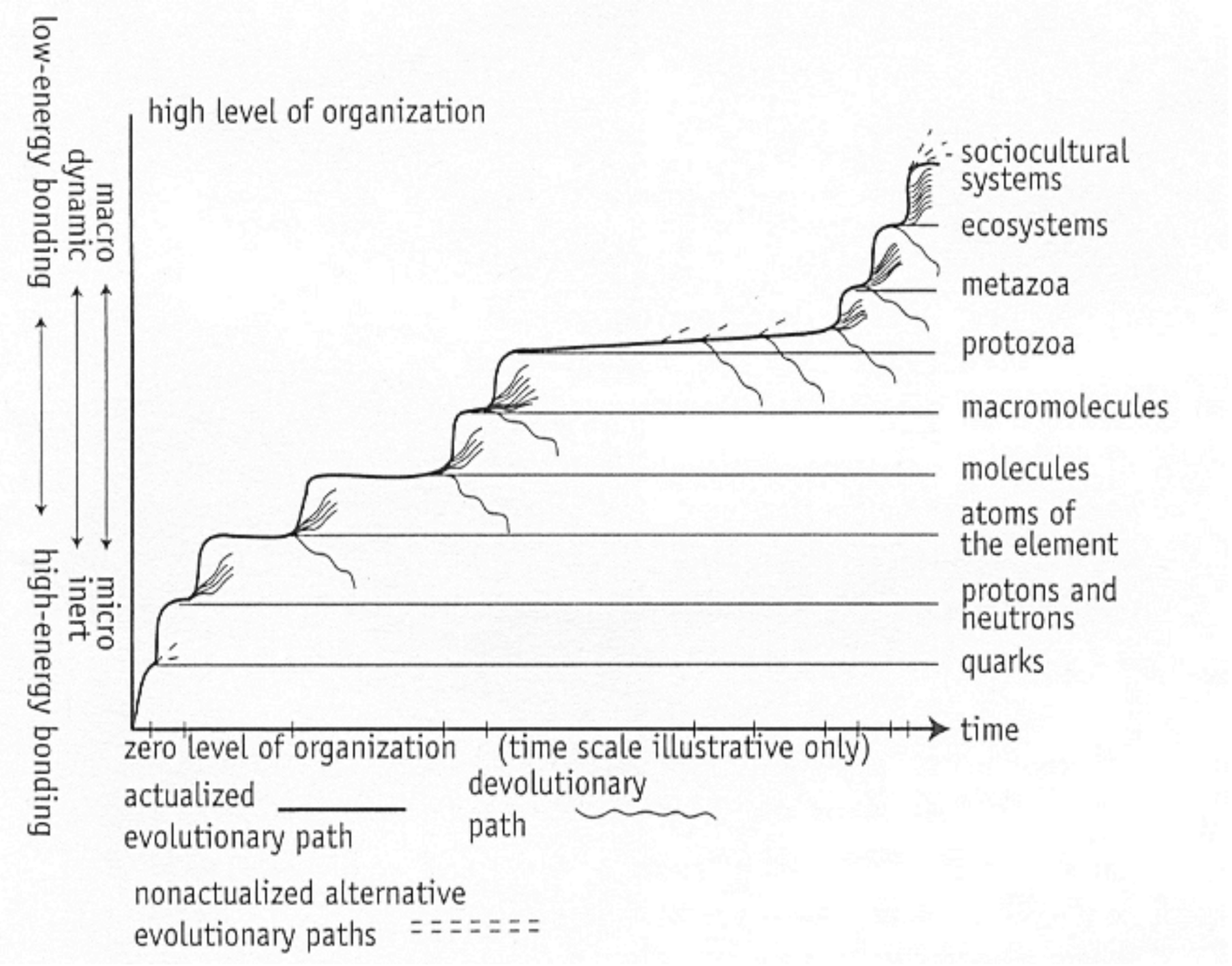


lower complexity

self-organisation

higher complexity

Definition: evolution

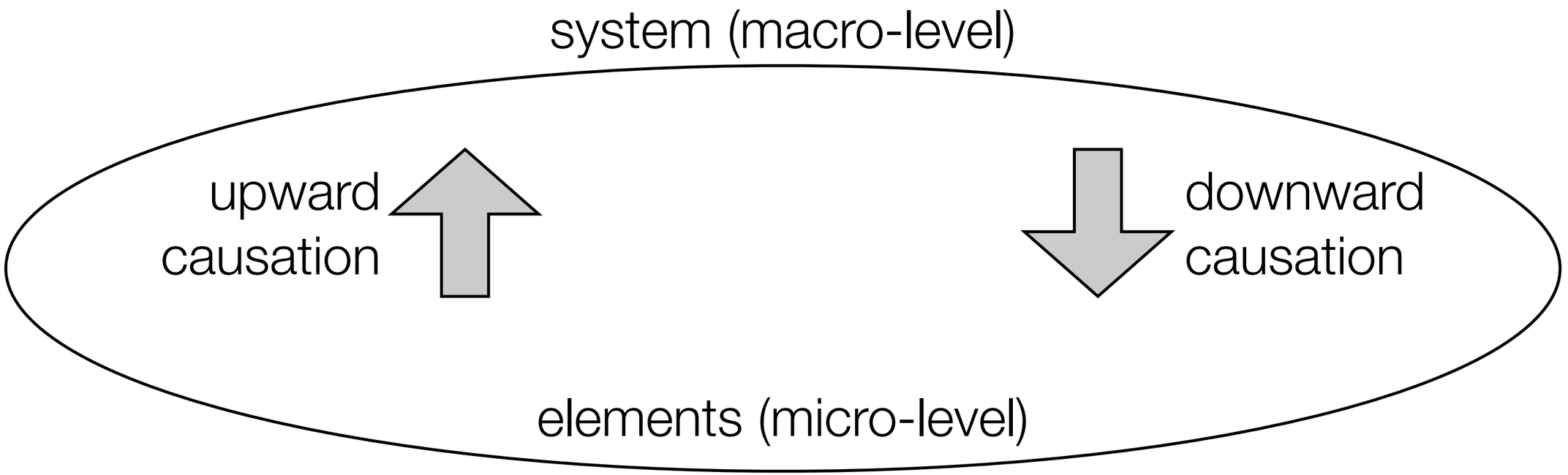


Definition: systemic hierarchy

organisation

components

Definition: systemic hierarchy



Definition: stage model

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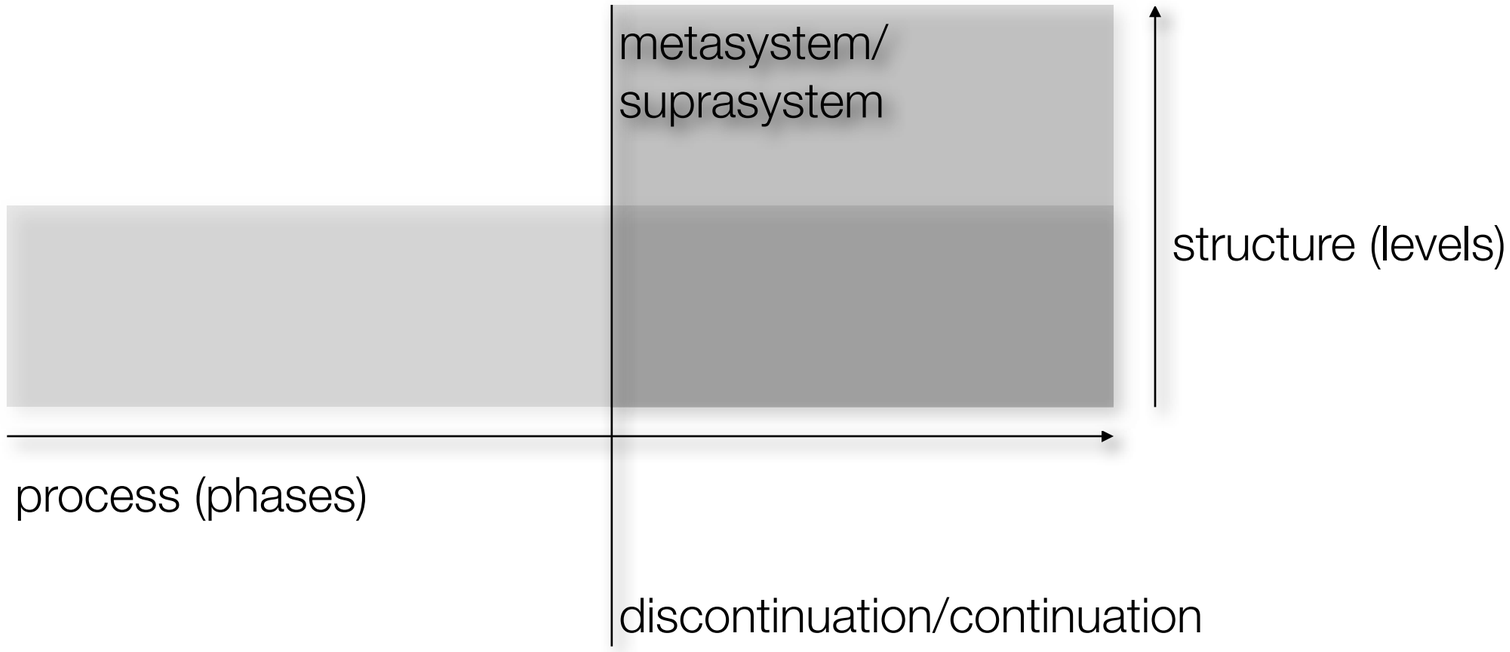
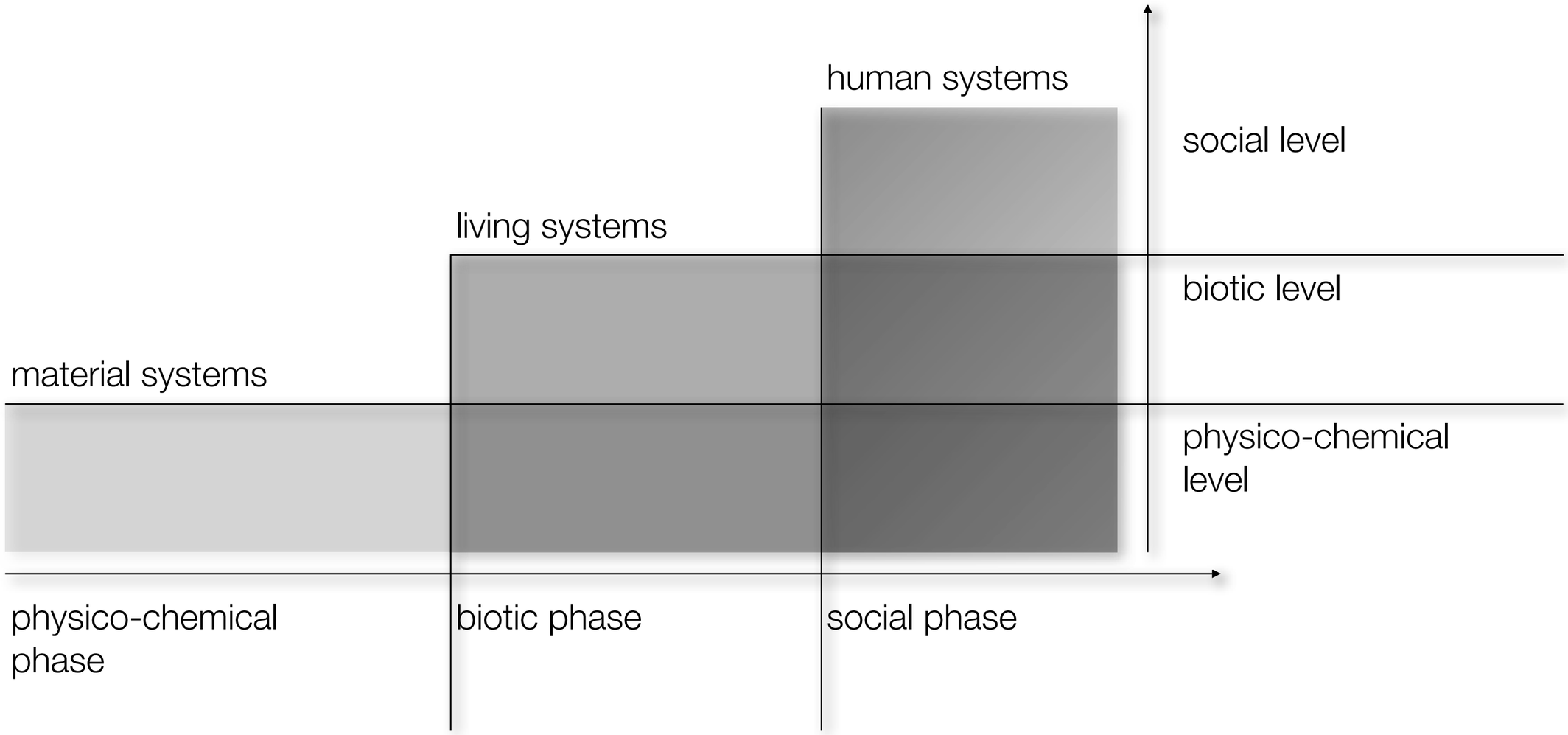


Definition: stage model



Irreproducibility

- There is no simple, "brute-force" operation that leads human interveners from a given initial state of the system to a well-defined, desired final state of the system.

  New way of dealing with complexity:

- **Governance:** make use of the system's dynamic: choose inputs so as to activate or inhibit self-organisation (but don't damage it)!

- **Decentralised context-steering:** make use of the system's architecture: grant relative autonomy and shape the general set-up only (don't instruct down to every detail)!

Irreversibility, Irreducibility

- There is no simple, causal transformation that leads the system with necessity from one state to another.

  New way of conceiving complexity:

- **Historicity:** model the path-dependency such that each phase depends on the prior phase but cannot be reversed!

- **Holarchy:** model the hierarchy such that each level depends on the lower one but cannot be reduced to it!

Unexplainability/unpredictability

- There is no simple, deductive inference that leads compellingly from premises about the system in one state (or systems) – or about one system layer – to a conclusion about the system in another state (or a metasystem) – or about another system layer.

  New way of constructing knowledge of complexity:

- **Leaps in quality in time:** it needs saltations when going from one state of a system to the next state (or from systems to the metasystem)!

- **Leaps in quality in space:** it needs saltations when going from one system layer to the next layer!

Information. Unified Theory of Information (UTI)

- Definition
- Triple-c: cognition, communication, cooperation
- Stages: pattern formation, code-making, the constitution of sense
- The universe of information

Definition

Information =def. relation that is constituted (1) by a self-organising **system** (which is the signmaker: *signator*) between (2) the **order** it builds up spontaneously (which is the sign: *signans*) and (3) some **perturbation** (which is the (to-be-) signified: *signandum*/*signatum*) originating in

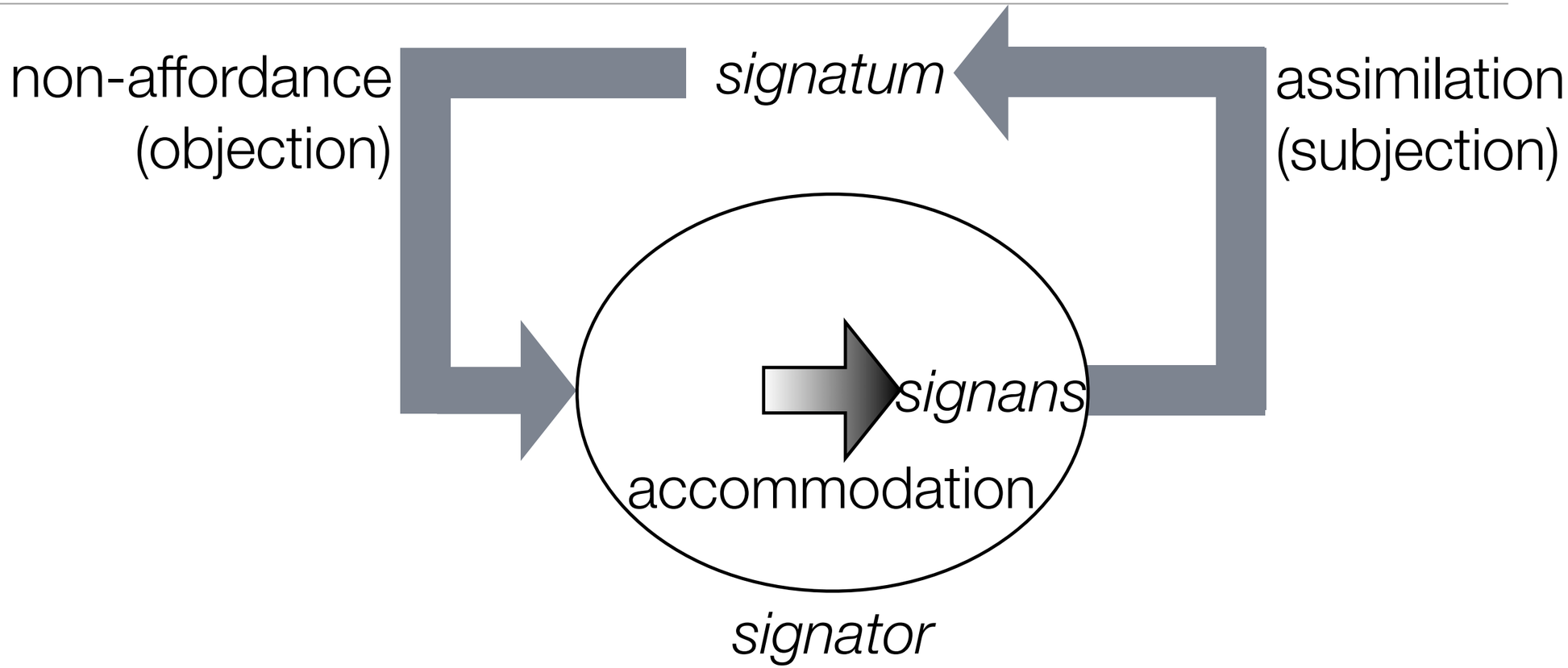
- the umwelt: cognition;
- co-systems: communication;
- the system all the co-systems give rise to: cooperation.

Triple-c

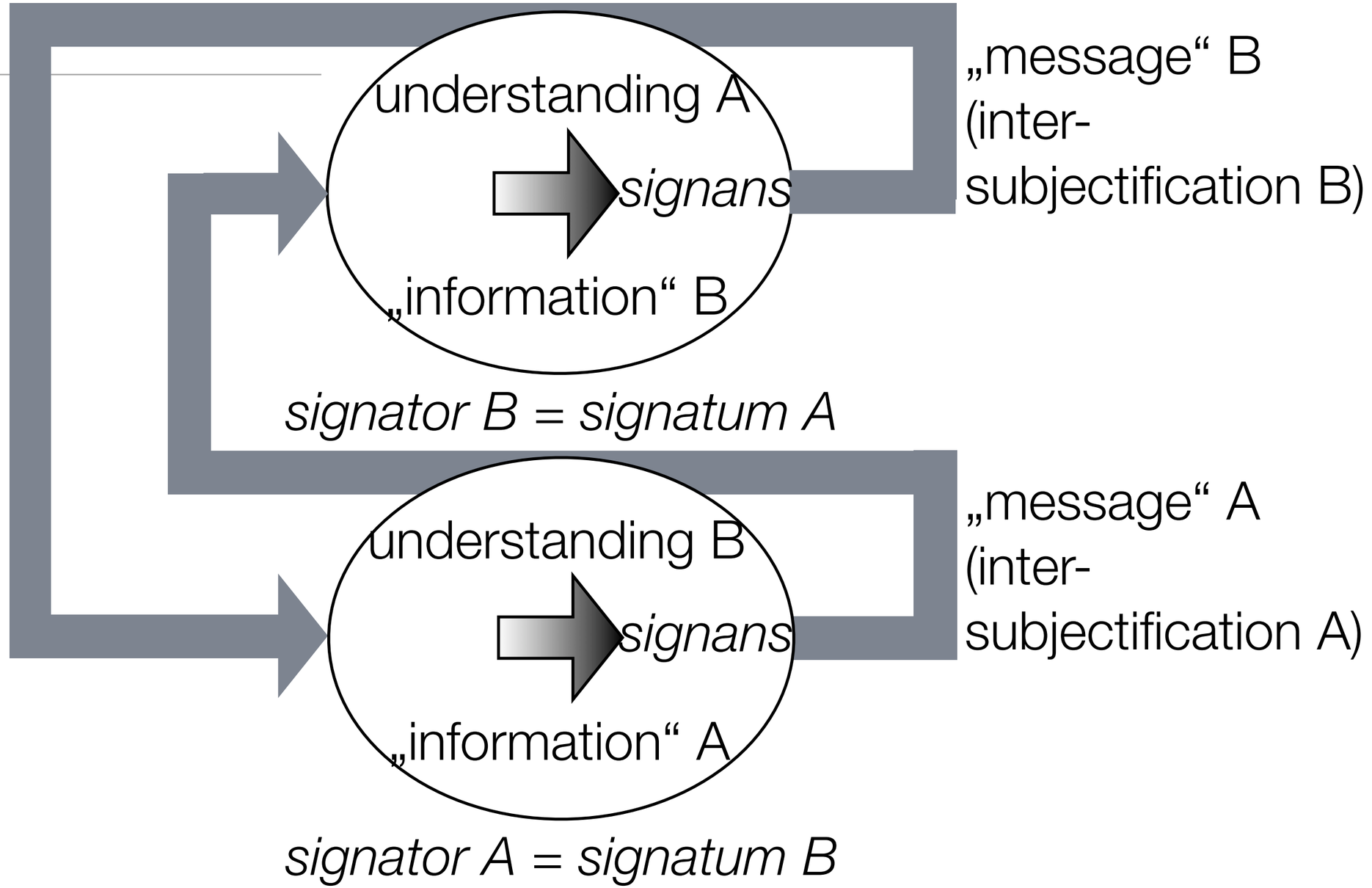
According to the systems dimensions we find different fields in which information generation occurs:

system dimension	information generation fields
one element for itself	cognition
the interaction of elements	communication
the integration of elements with the system	cooperation

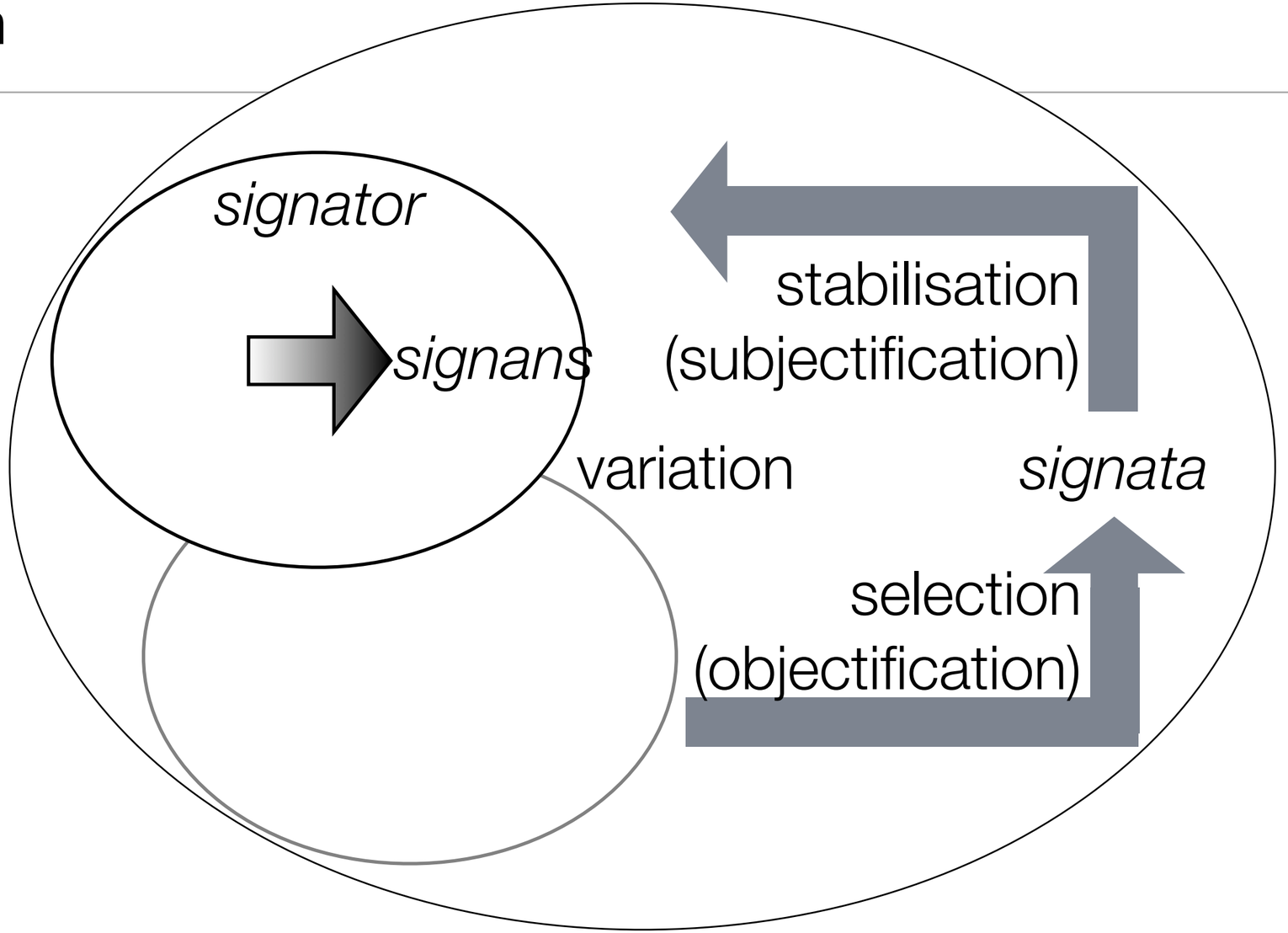
Cognition


non-affordance
(objection)
signatum
assimilation
(subjection)
signans
accommodation
signator

Communication



Cooperation

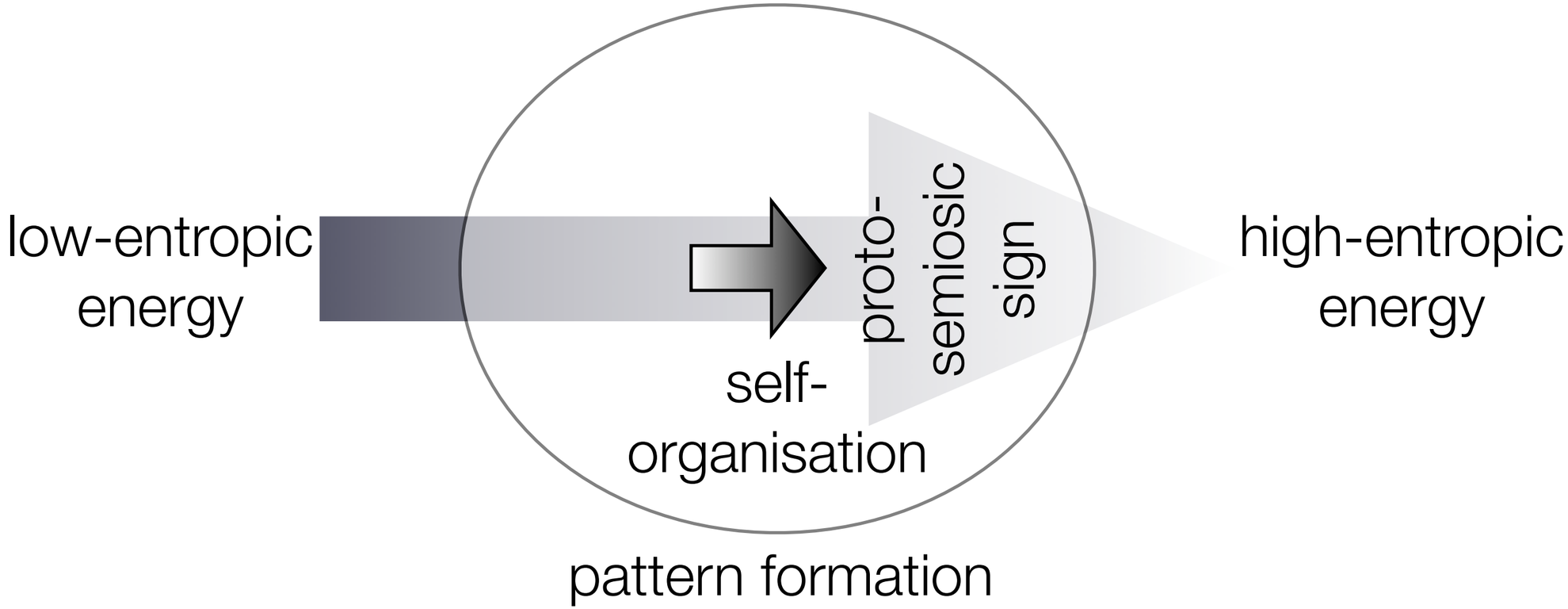


Stages

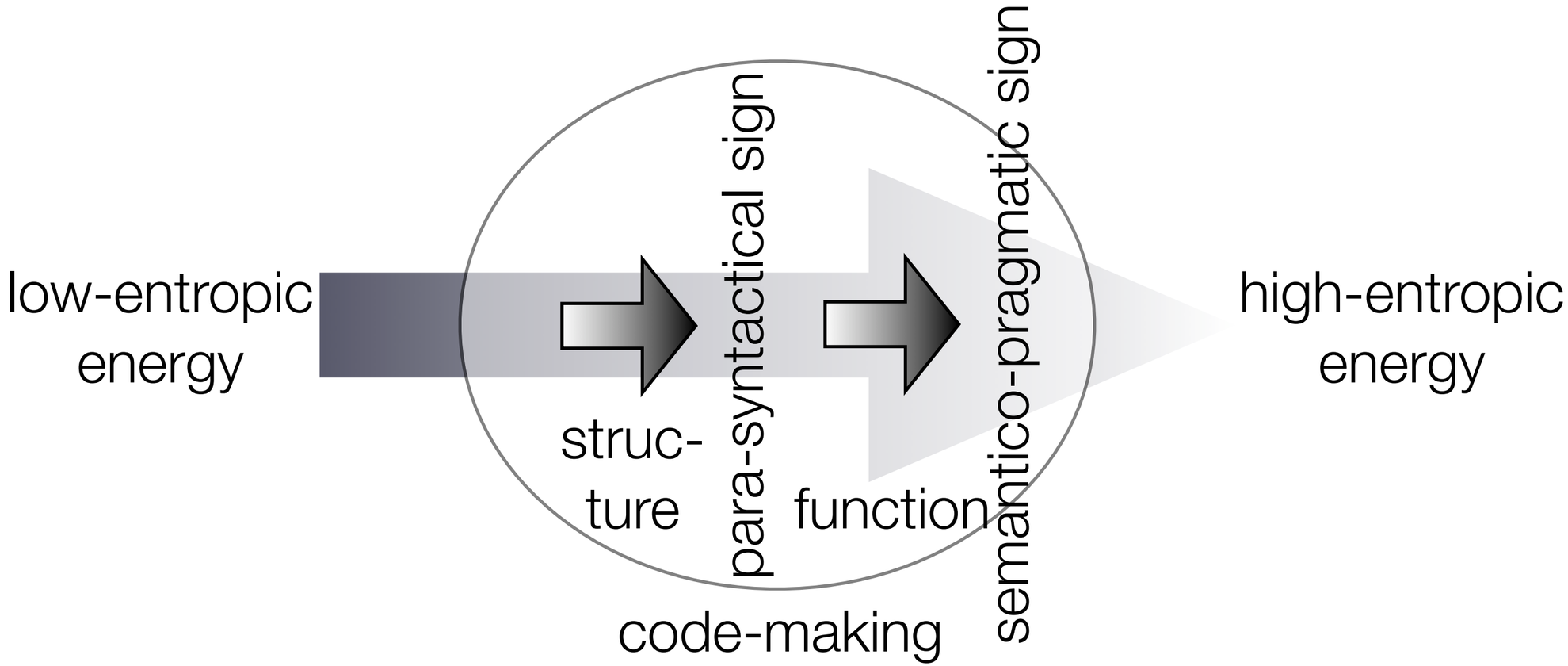
According to stages of evolution we find different types of generating information:

evolutionary system stages	information generation types
material systems	pattern formation
living systems	code-making
human systems	constitution of sense

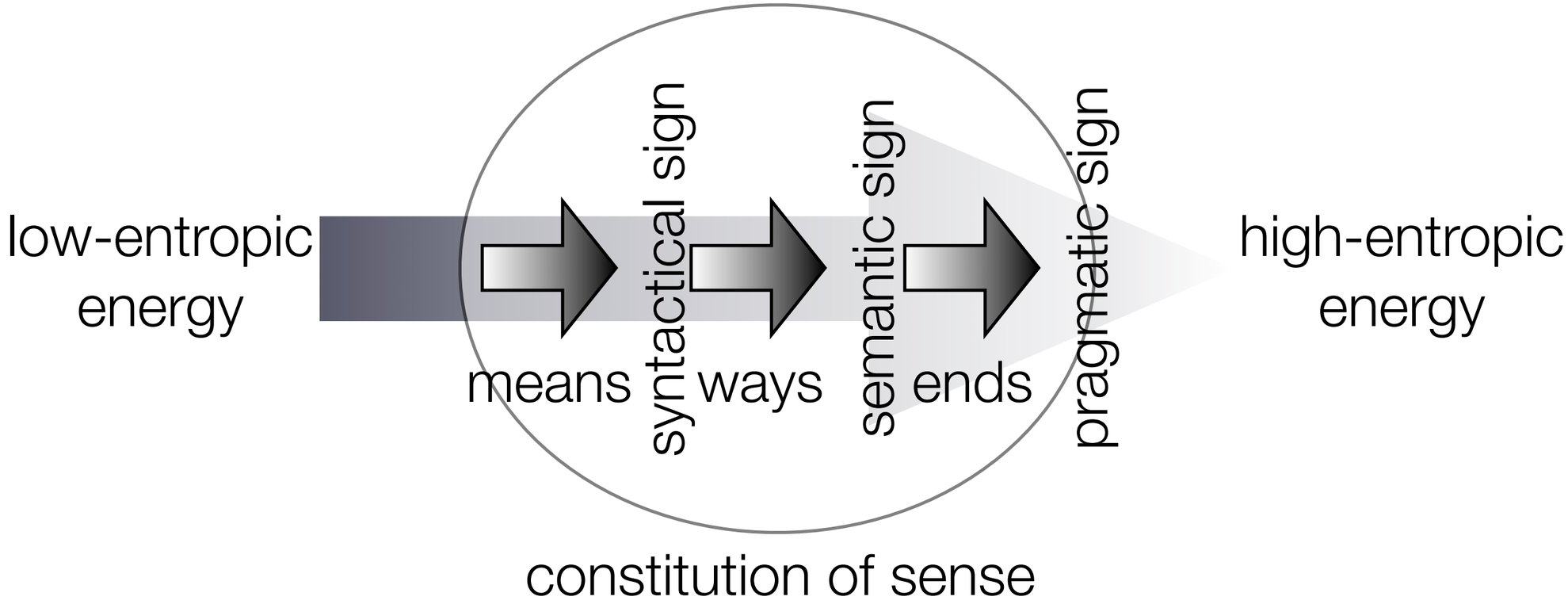
Pattern formation



Code-making


low-entropic
energy
struc-
ture
para-syntactical sign
function
semantico-pragmatic sign
high-entropic
energy
code-making

The constitution of sense



The universe of information

	ability to form patterns	code-making ability	sense-con-stituting ability
cooperativity	cohesiveness	organicity	sociability
communicability	coherency	signalability	languageability
cognisability	reflectivity	psyche	consciousness

¡Muchas gracias por vuestra atención!