

Emergent information. A Unified Theory of Information framework

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1 Accounts of information: Capurro's trilemma (resolved)

	information terms	discussion
synonymy (reduction)	one and the same meaning	false unification attempt (identity)
analogy (projection)	similar meanings	failed unification attempt (identity): what is the standard of comparison?
equivocity (disjunction)	disparate meanings	surrender to diversification (in-/ difference): Babel

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equivocity (disjunction)	disparate meanings	surrender to diversification (in-/ difference): Babel
specification hierarchy (integration)	historically-logically connected meanings: reproducing evolutionary steps (emergence)	unity-through-diversity attempt (identity and difference): never-ending process of defining and refining

1 Accounts of information: Capurro's trilemma (resolved)

	handling...	understanding...	studying information
synonymy (reduction)	objectivism	materialism	externalism
	object of action	material object	third-person study object
analogy (projection), equivocity (disjunction)	subjectivism	idealism	internalism
	subjective action	immaterial action (monistic, dualist)	interpretative action (first-person study)
specification hierarchy (integration)	subject-object dialectics	emergentist materialism	perspective shifting
	subjective/objective	agency/relations	outside/inside

2 A unified theory (UTI) as backbone of a Science of Information

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2 A unified theory (UTI) as backbone of a Science of Information

The historical-logical account of information:

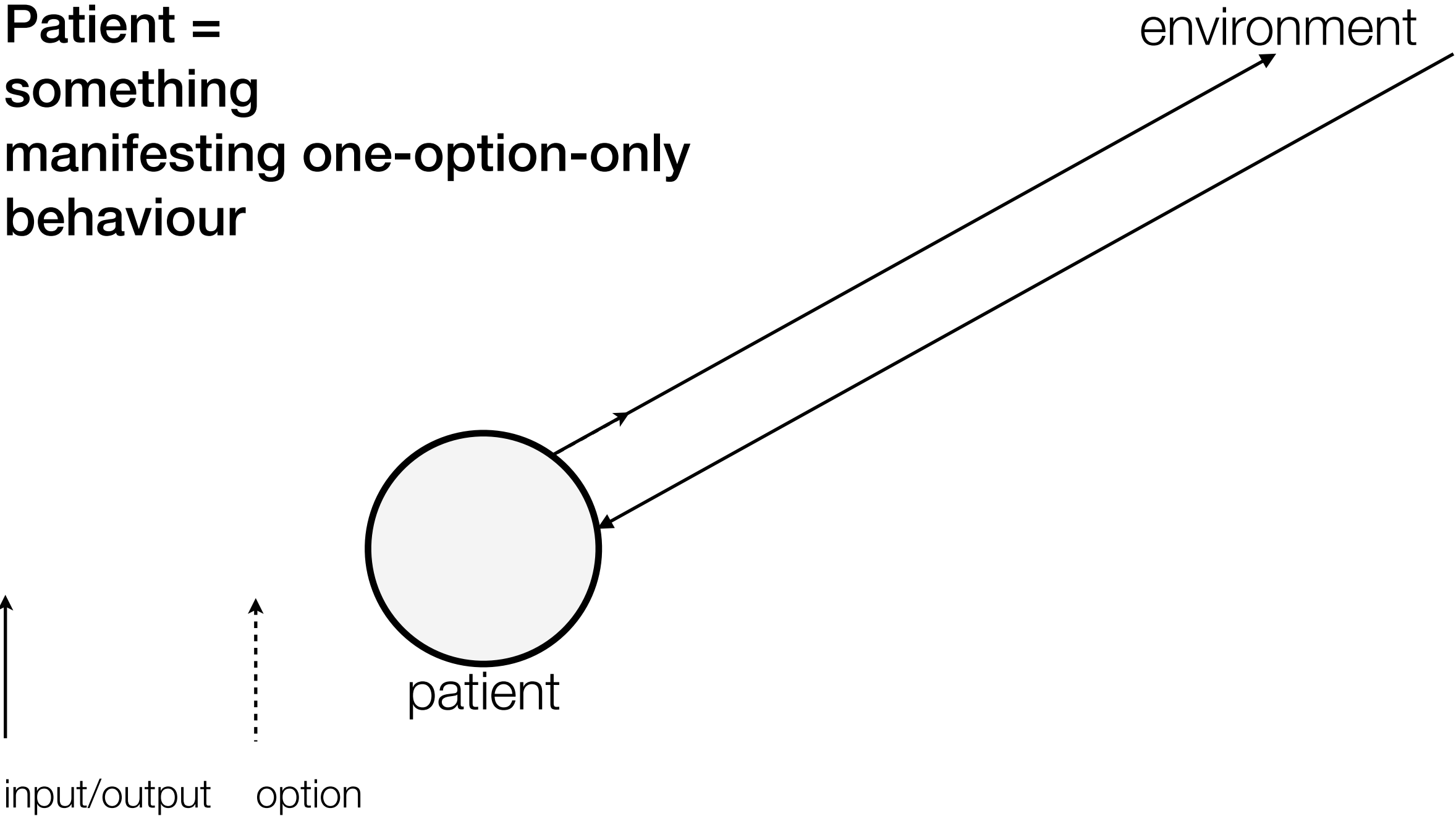
- the meaning of the concept of information has to comprehend both what different manifestations have in **common** and what is **unique** to each of them;
- historical manifestations of information **descend** from earlier manifestations but do **not derive** from them logically;
- each understanding of a **particular** manifestation enriches and extends the **universal** concept.

2.1 Emergent information

Information co-extends with self-organisation.

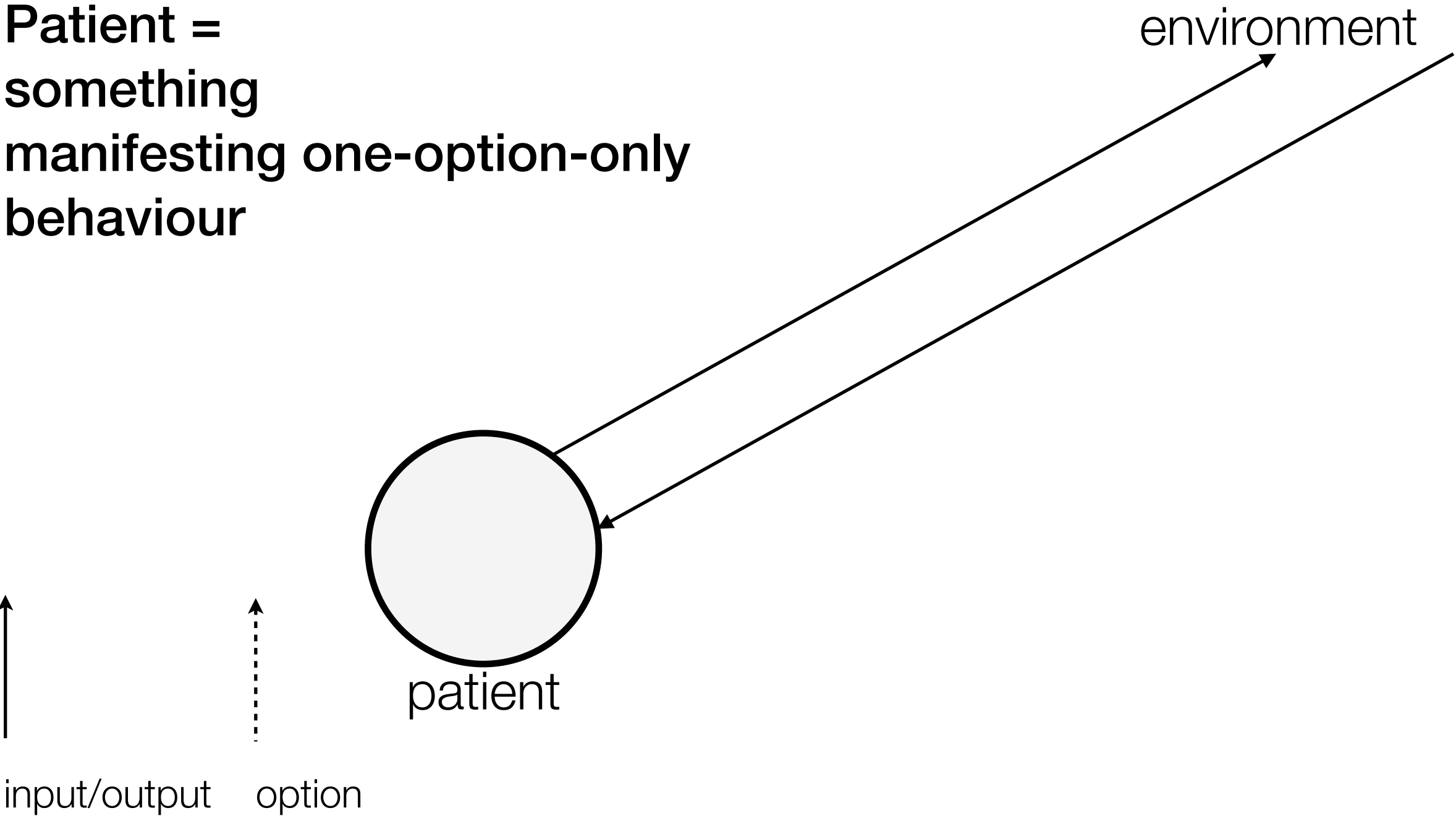
2.1 Emergent information

**Patient =
something
manifesting one-option-only
behaviour**



2.1 Emergent information

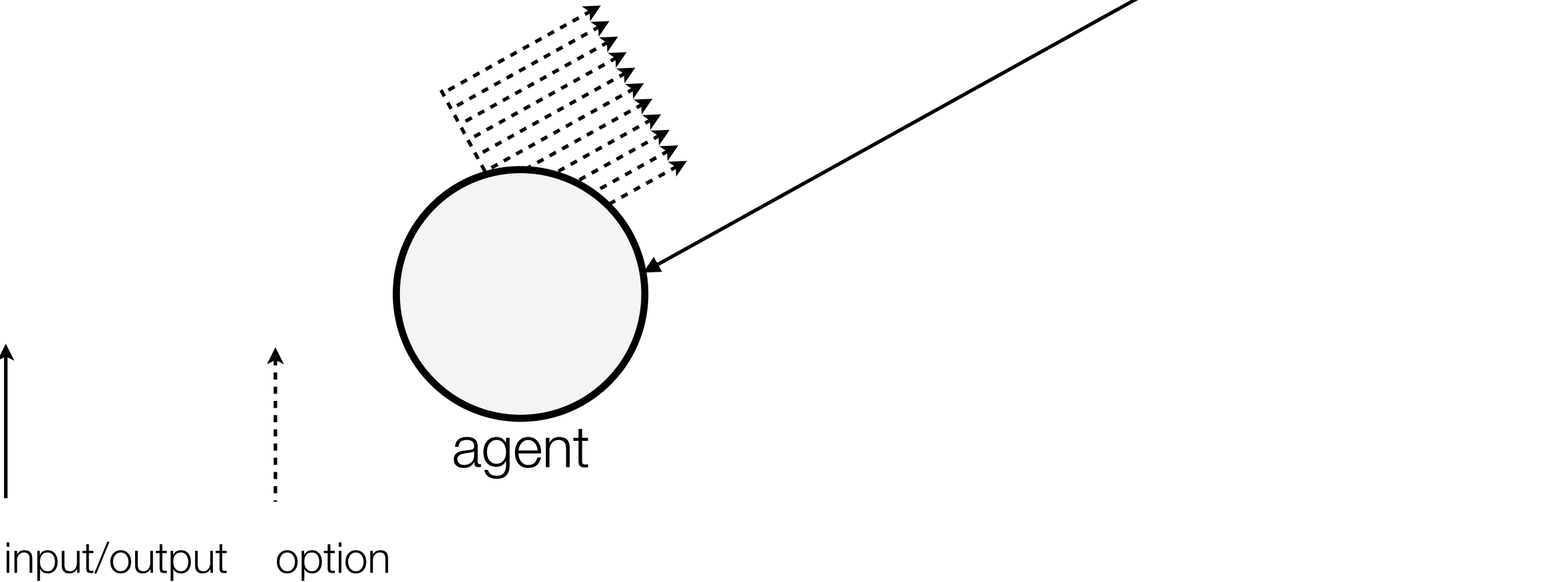
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2.1 Emergent information

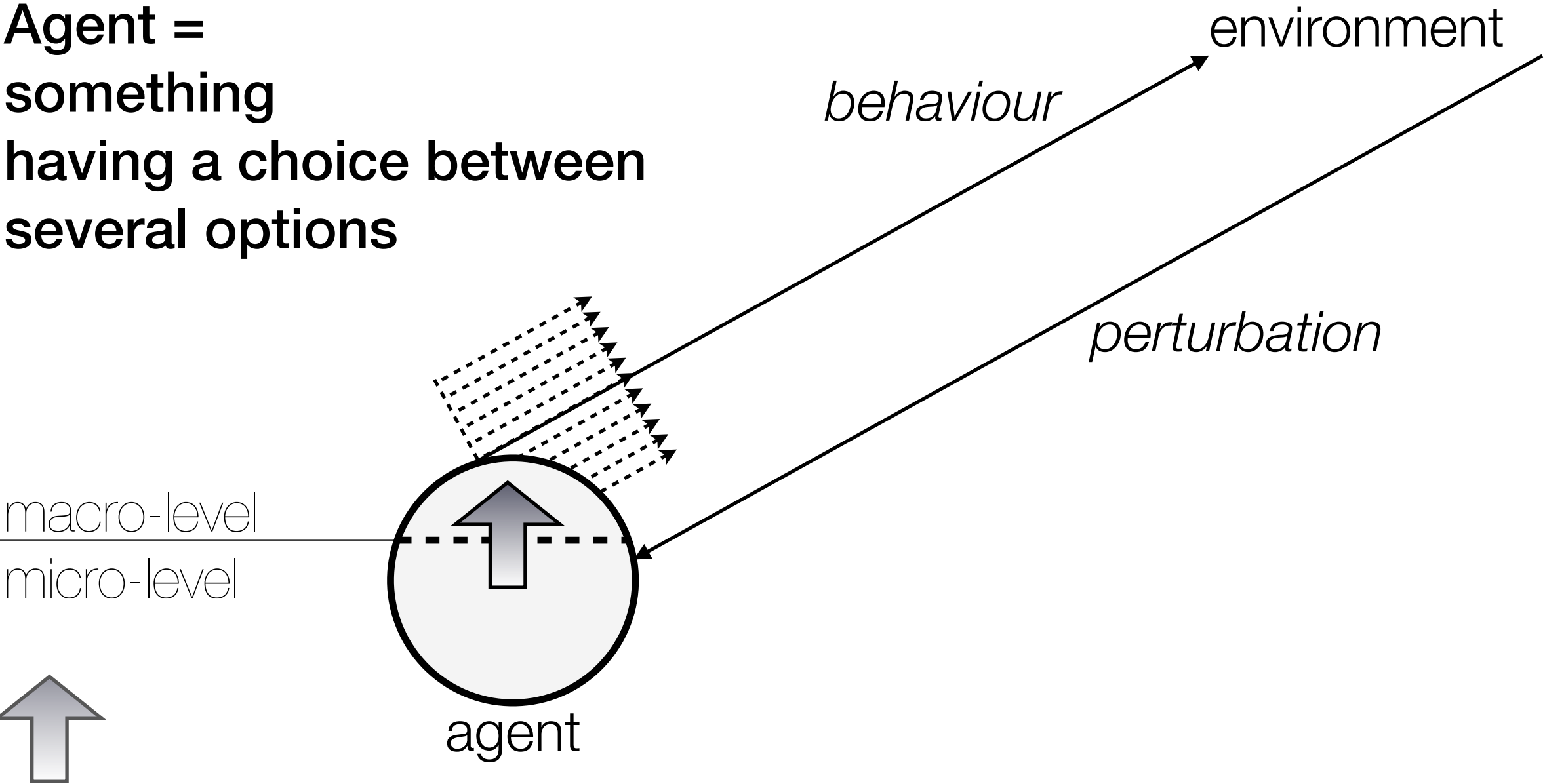
**Agent =
something
having a choice between
several options**

environment



2.1 Emergent information

**Agent =
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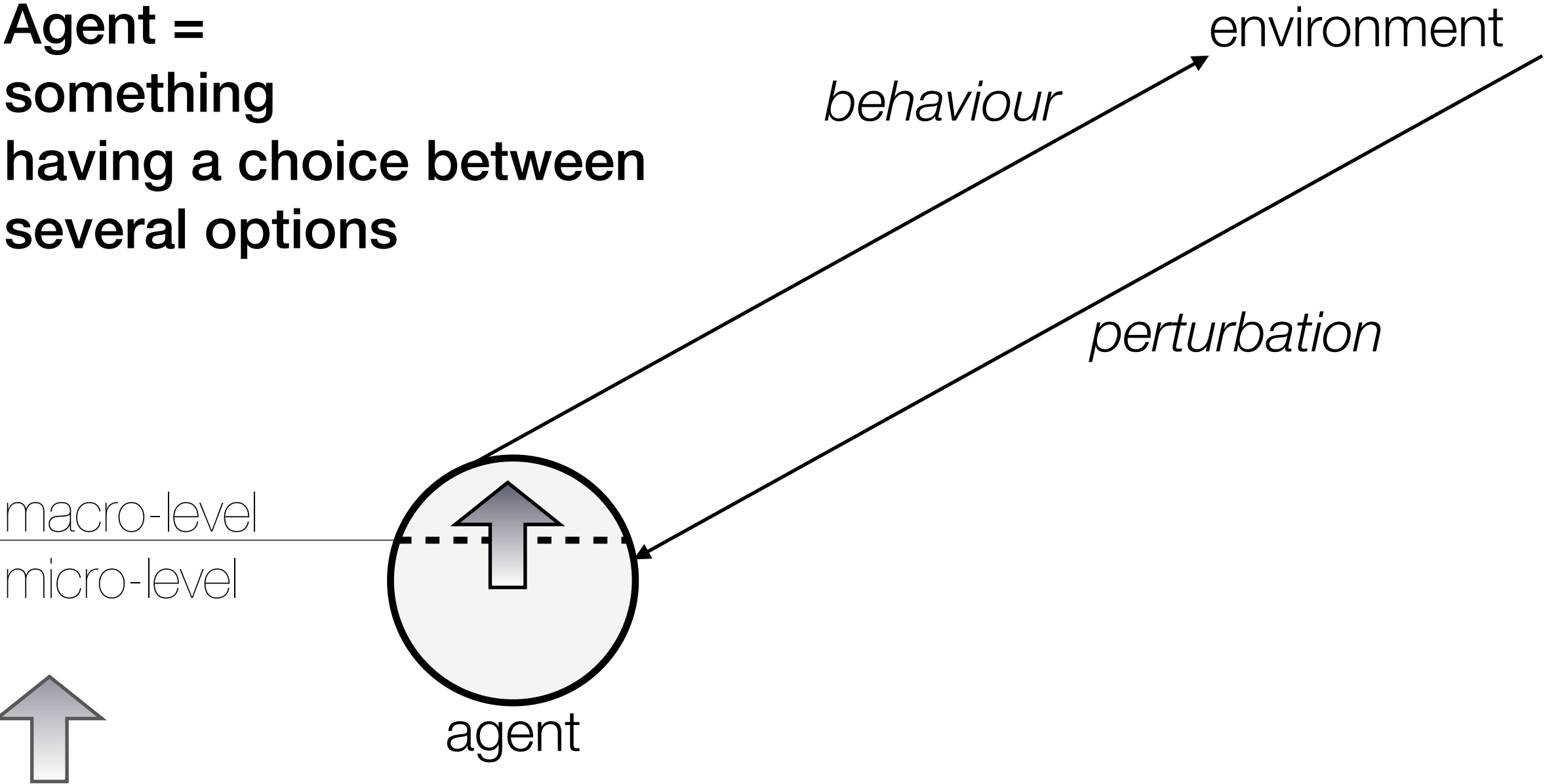


self-organisation (emergence of order)



2.1 Emergent information

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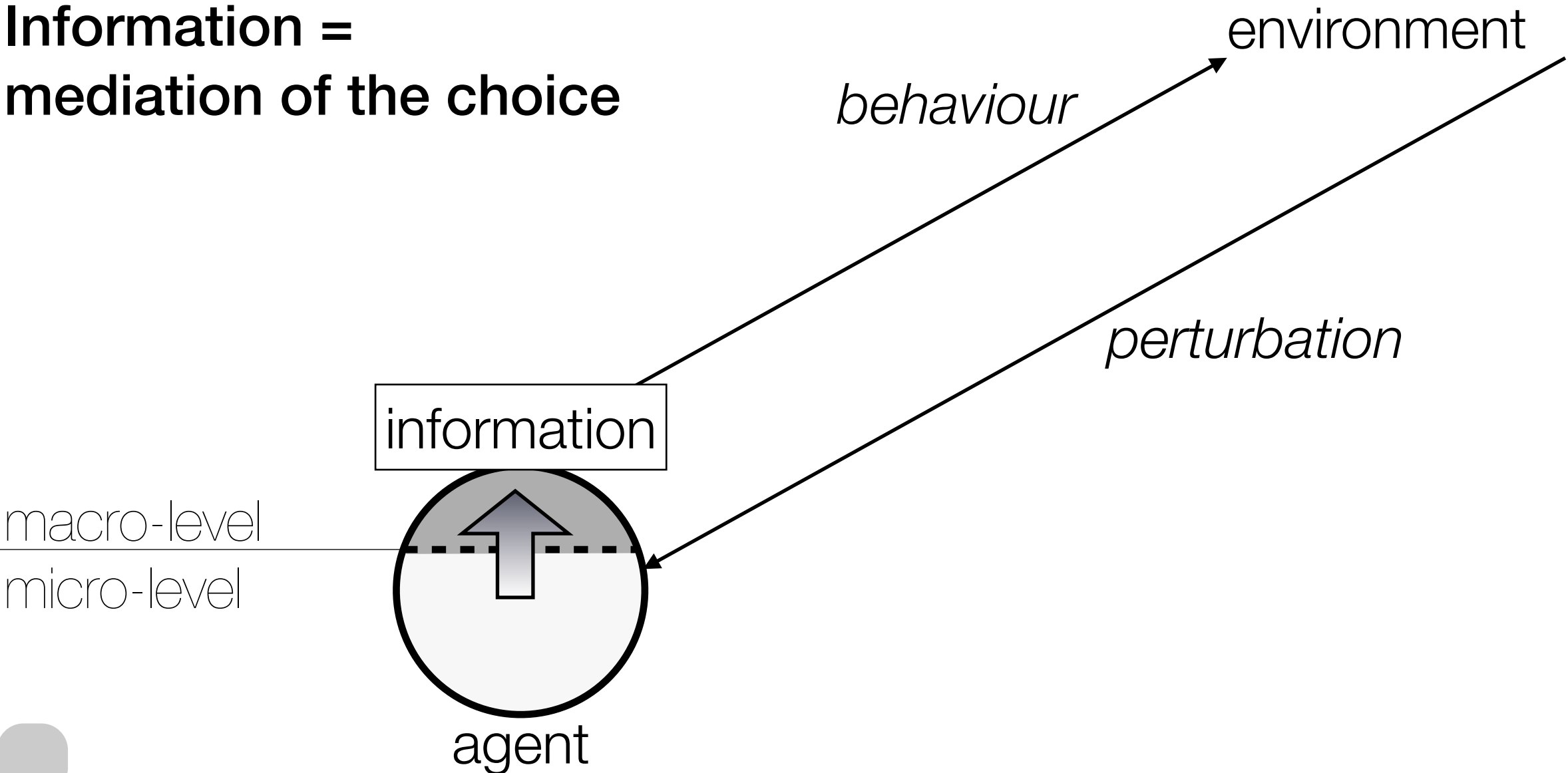


self-organisation (emergence of order)



2.1 Emergent information

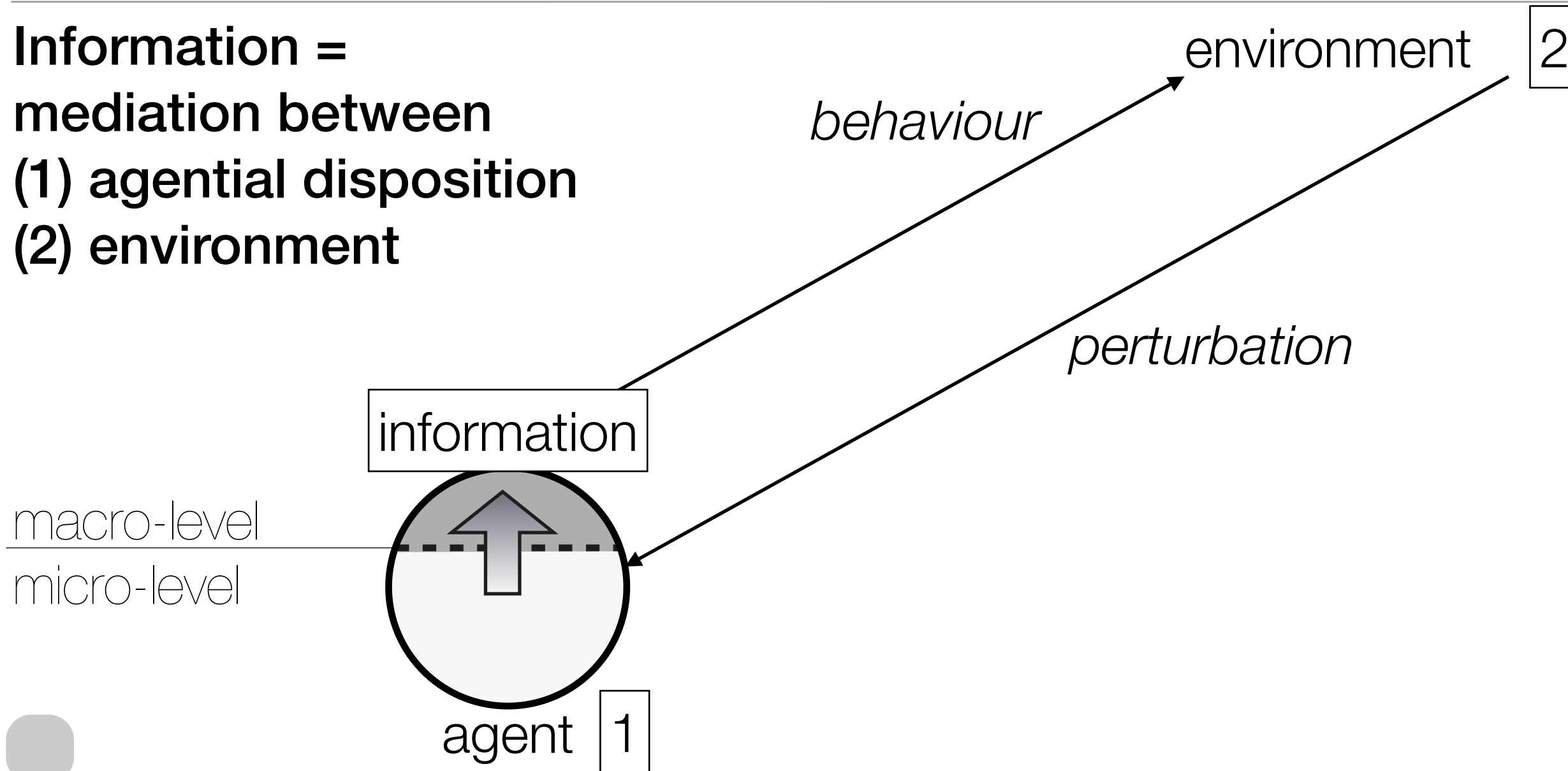
**Information =
mediation of the choice**



self-organised order = generated/utilised information (mediator)

2.1 Emergent information

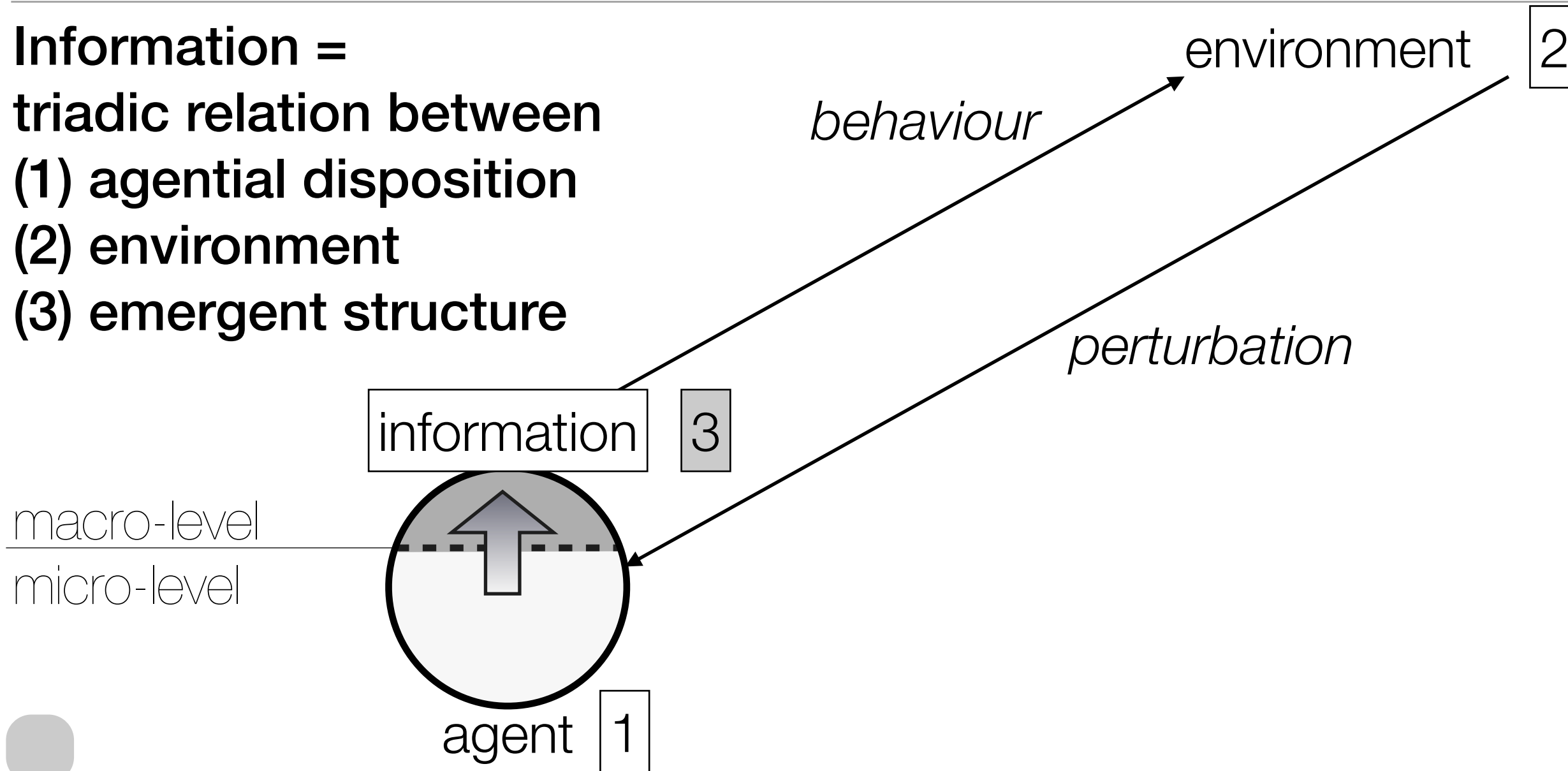
**Information =
mediation between
(1) agential disposition
(2) environment**



self-organised order = generated/utilised information (mediator)

2.1 Emergent information

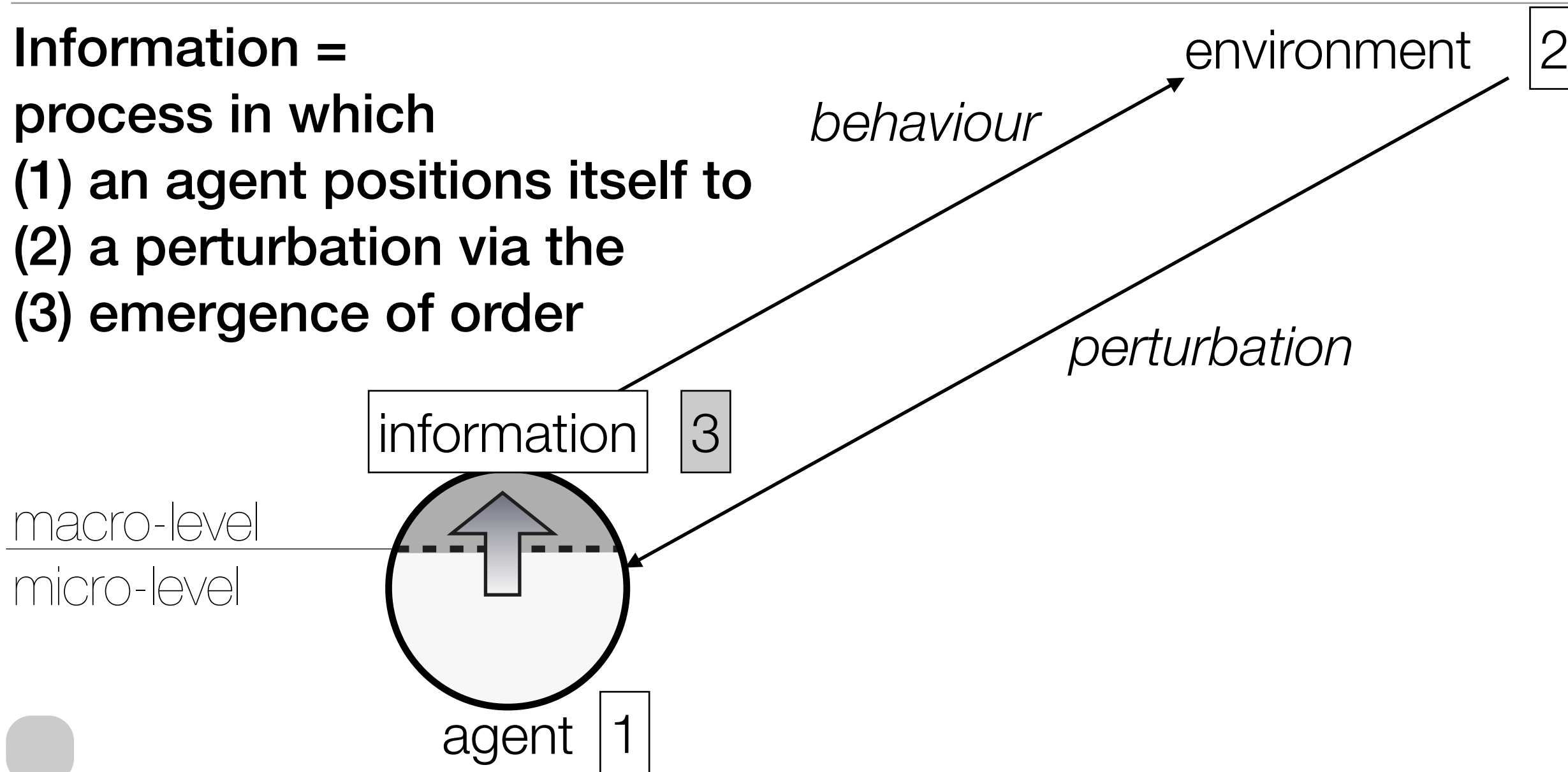
Information =
triadic relation between
(1) agential disposition
(2) environment
(3) emergent structure



self-organised order = generated/utilised information (mediator)

2.1 Emergent information

Information =
process in which
(1) an agent positions itself to
(2) a perturbation via the
(3) emergence of order



self-organised order = generated/utilised information (mediator)

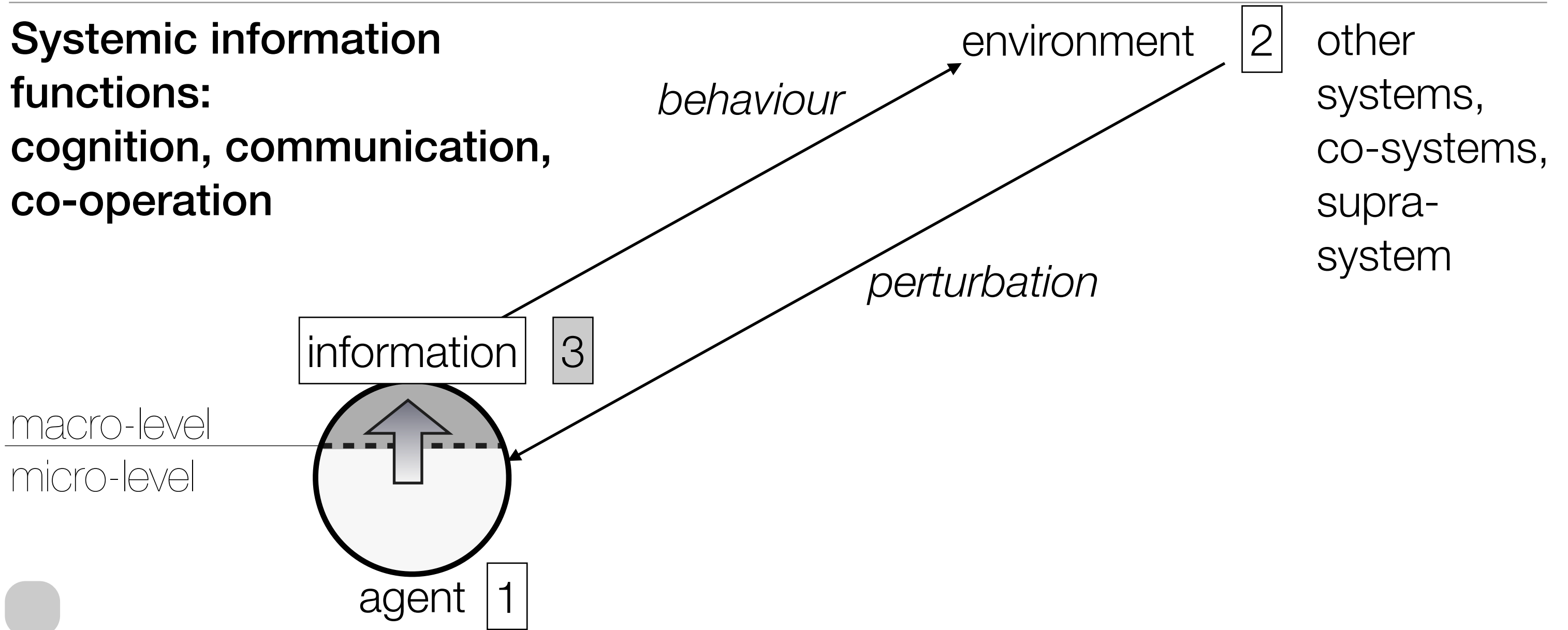
2.1.1 Cognition – communication – co-operation

The Triple-C Model of information:

Information appears across the nested intra-, inter- and suprasystemic functions from **cognition** over **communication** to **co-operation**.

2.1.1 Cognition – communication – co-operation

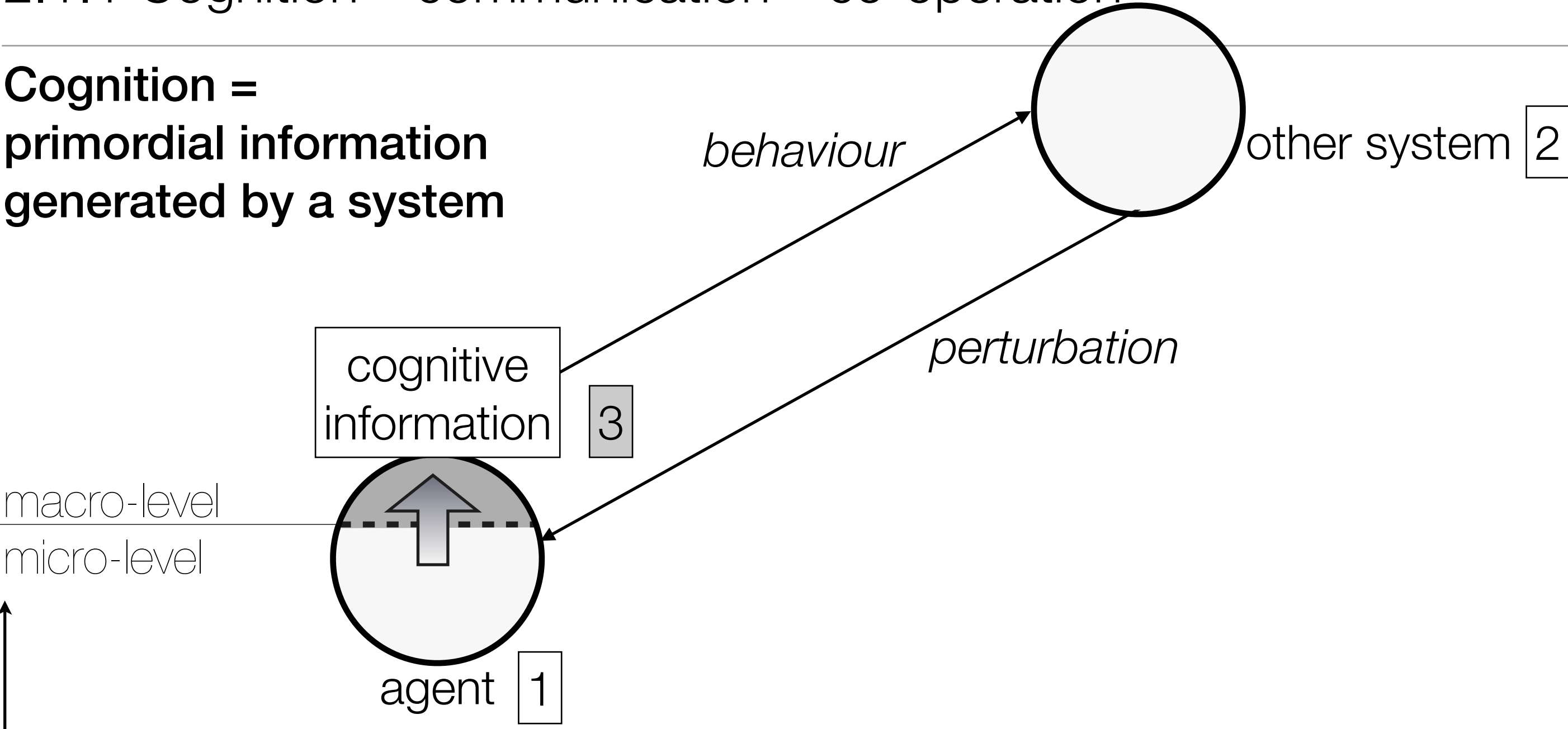
**Systemic information functions:
cognition, communication,
co-operation**



self-organised order = generated/utilised information (mediator)

2.1.1 Cognition – communication – co-operation

Cognition = primordial information generated by a system

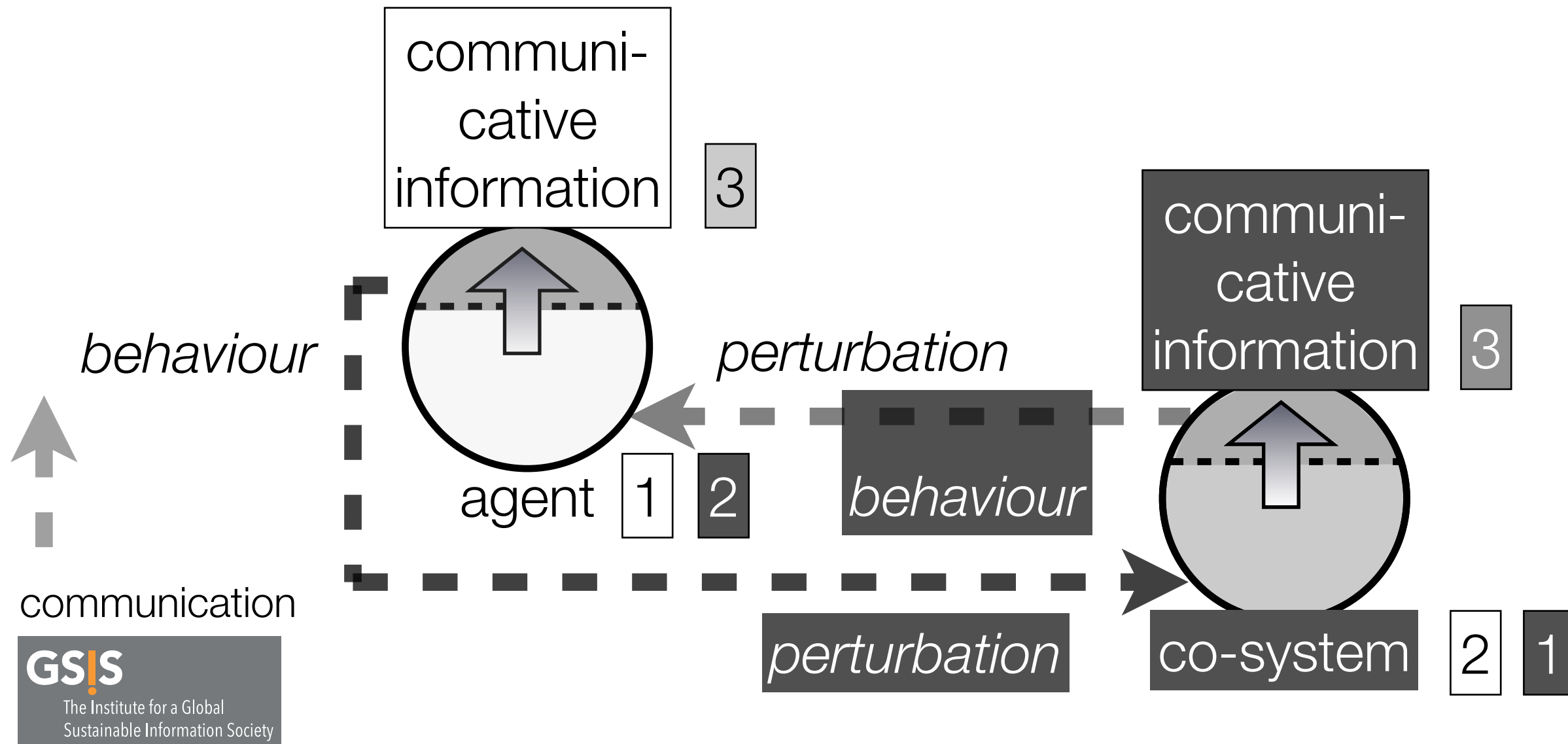


cognition



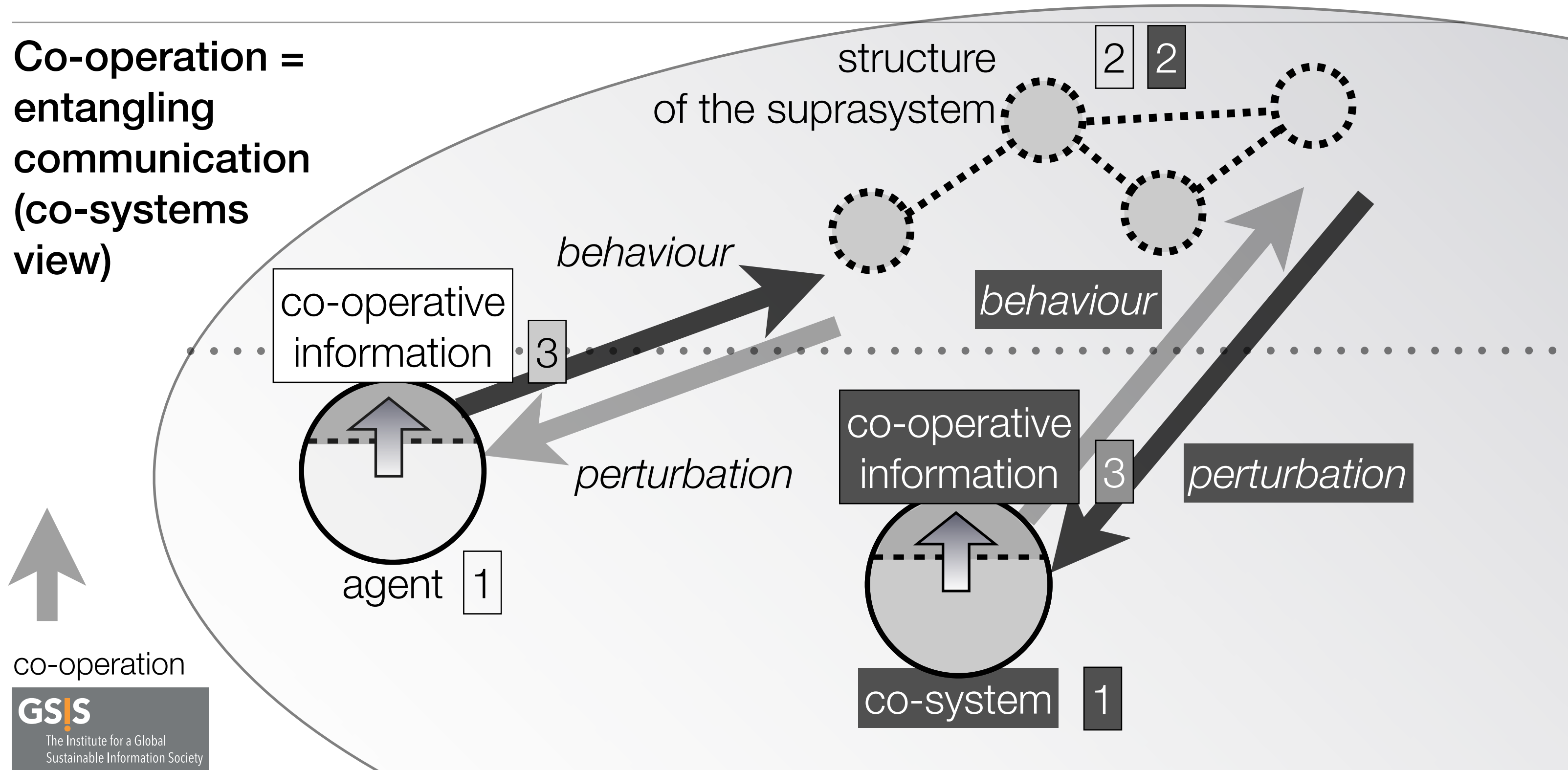
2.1.1 Cognition – communication – co-operation

**Communication =
coupling of cognitions of co-systems**



2.1.1 Cognition – communication – co-operation

**Co-operation =
entangling
communication
(co-systems
view)**



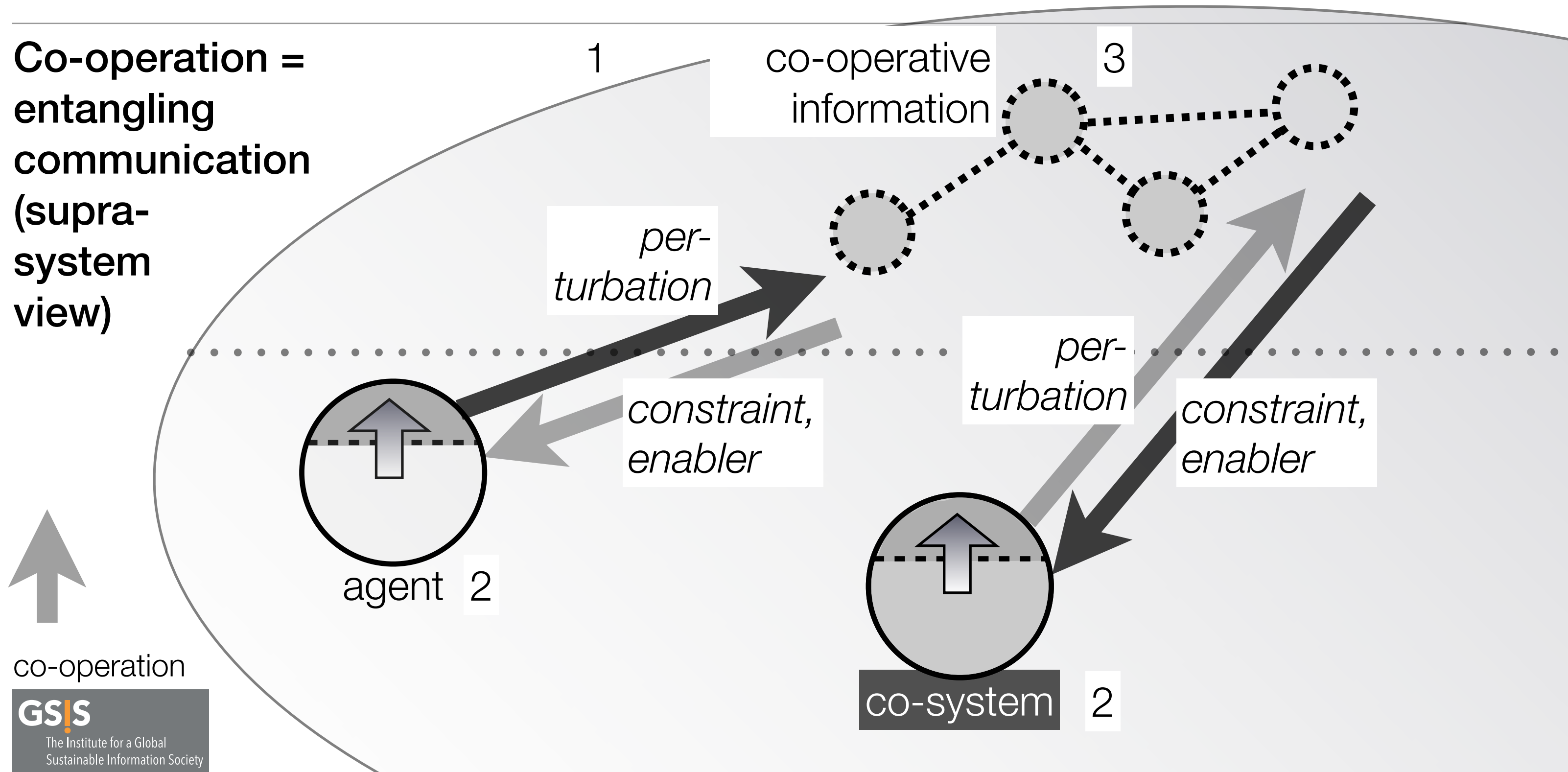
co-operation

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**Co-operation =
entangling
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co-operation

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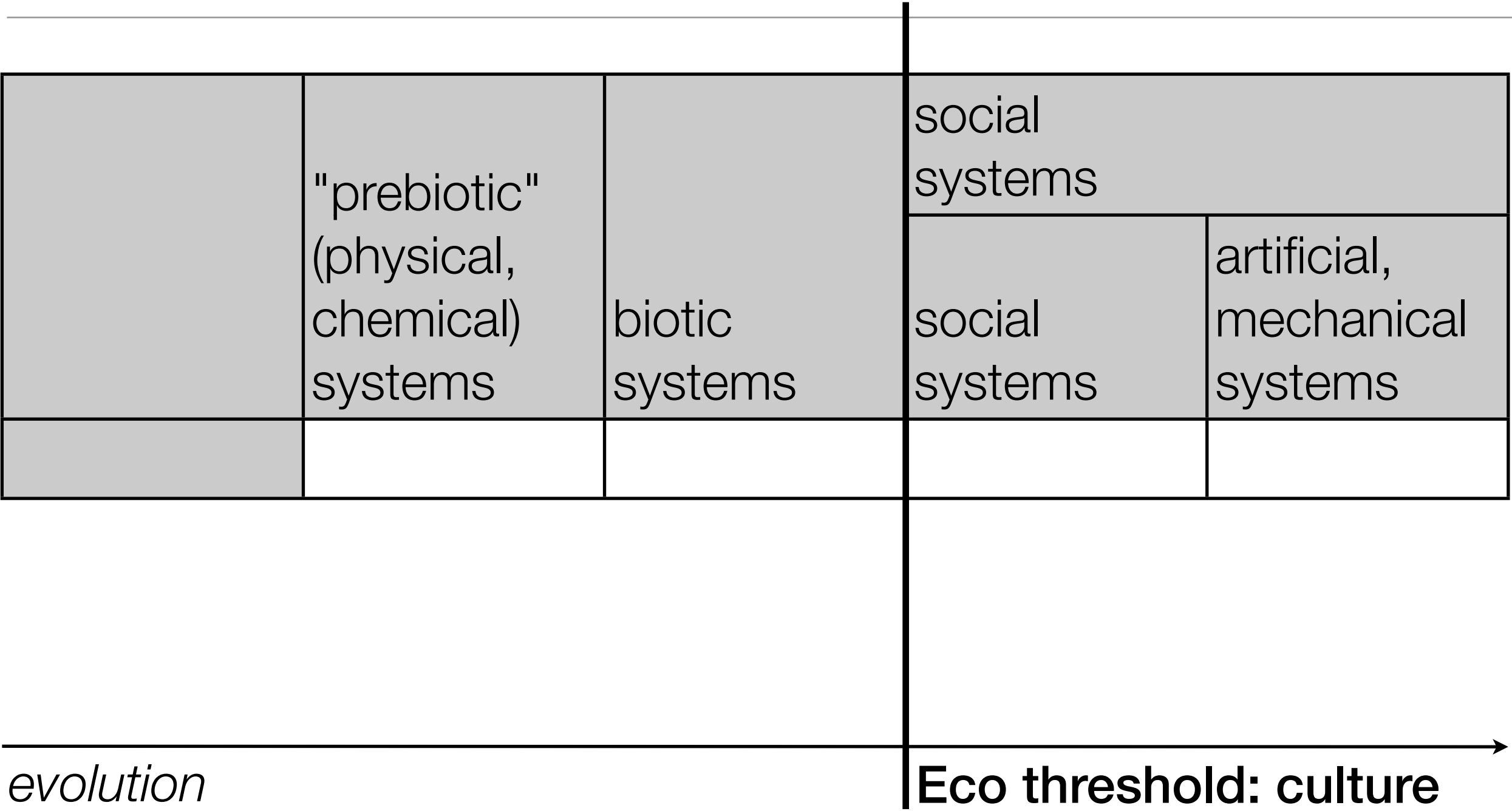
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2.1.2 Physical, biotic, and social information

The Multi-Stage Model of information:

Information manifests itself along the evolutionary chain of differentiated system categories **from physical over biotic to social systems.**

2.1.2 Physical, biotic, and social information



2.1.2 Physical, biotic, and social information

	"prebiotic" (physical, chemical) systems	biotic systems	social systems	
			social systems	artificial, mechanical systems
semiotics	no	no	yes	no

evolution → **Eco threshold: culture**

2.1.2 Physical, biotic, and social information

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evolution → **Fuchs-Kittowski threshold: life**

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evolution → **Hofkirchner threshold: self-organisation**

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	"prebiotic" (physical, chemical) systems	biotic systems	social systems	
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complexity	yes	yes	yes	no

evolution → **Hofkirchner threshold: self-organisation**

2.2 Example: understanding "Artificial Intelligence" (AI)

	"prebiotic" (physical, chemical) systems	biotic systems	social systems	artificial, mechanical systems
semiotics	no	no	yes	no
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complexity	yes	yes	yes	no

evolution → **Hofkirchner threshold: self-organisation**

2.2 Example: understanding "Artificial Intelligence" (AI)

"Man"/society and machine:

The relationship of "man"/society and the machine is modelled

- either on the basis of the **identity** (reductionism, projectionism)
- or the **in-/difference** (disjunctionism),
- or **identity and difference** (integrationism),

of their levels of complexity.

2.2.1 Identity of "man"/society and machine

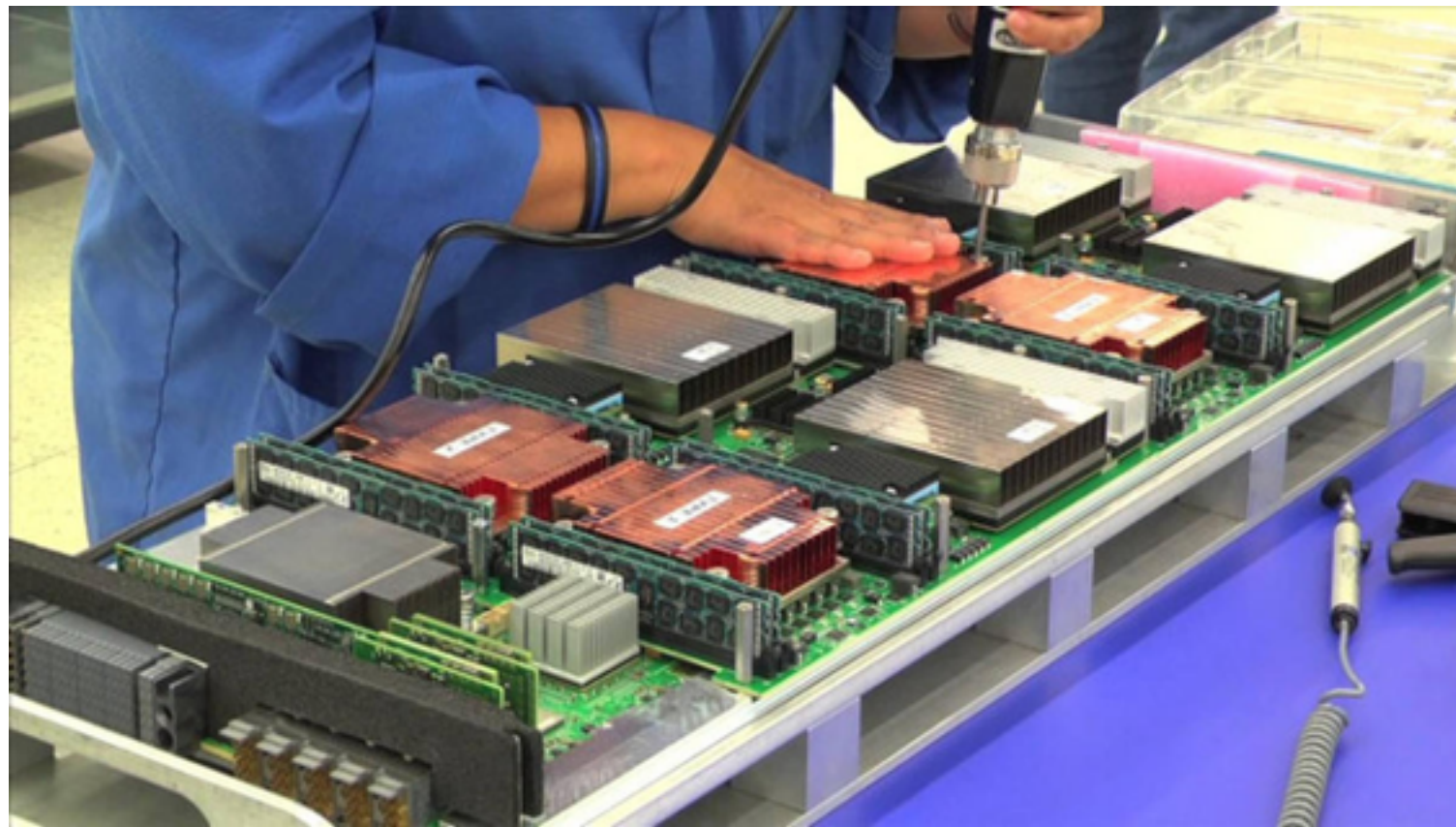
"Man"/society-machine models			
conflation	monism: "man"/society and mechanism are deemed identical inasmuch as they share the same level of complexity	reduction	technomorphism: the level of complexity of "man"/society is assumed to be as low as that of a mechanism
		projection	anthropomorphism: the level of complexity of a mechanism is assumed to be as high as that of "man"/society

2.2.1.1 Identity by reduction: "man"/society is a machine – stepwise dehumanisation

- (1) Society is reduced to the **individual actor** – a fallacy of *horizontal reduction* of complexity (from the macro- to the micro-level of a system);
- (2) the individual actor is reduced to its **body**, a social being to a living being, to a biotic system – a fallacy of *biologism* (a *vertical* reduction from social complexity on a higher evolutionary level to biotic complexity on a lower evolutionary level);
- (3) the human body is reduced to its **physical substrate** – a fallacy of *physicalism* (reduction from biotic to physical complexity);
- (4) the physical substrate of the human body is reduced to a **mechanism** – a fallacy of *strict determinism* (reduction from the complexity of self-organising systems capable of emergent properties to the zero-complexity level of hetero-organised entities devoid of emergence).

2.2.1.1 Identity by reduction: "man"/society is a machine – stepwise dehumanisation

Examples: Materialism in education of computer and cognitive scientists ("If I can model it with engineering or natural science methods, I understand it")



2.2.1.2 Identity by projection: any machine is like "man"/society – stepwise animation

- (1) The essential features of the **social system** are projected onto the level of the individual actor;
- (2) the essential features of the **individual actor** as a social being are projected onto the human body as biotic system;
- (3) the essential features of the **human body** are projected onto its physical substrate;
- (4) the essential features of the **physical substrate** of the human body are projected onto any mechanism, be it natural or artificial.

2.2.1.2 Identity by projection: any machine is like "man"/society – stepwise animation

Examples: Info-Computationalism ("The universe is a natural computer")*, panpsychism and animism ("The universe is ensouled"), Gaia hypothesis ("The planet is a living organism")**



2.2.2 In-/Difference of "man"/society and machine

	"Man"/society-machine models	
disjunction	dualism: "man"/society and mechanisms are deemed independent entities of different or same complexity	human exceptionalism: "man"/society is assumed to be of an unequalled complexity level
		technological exceptionalism: a mechanism of an unequalled complexity level is assumed feasible
		"man"/society-machine egalitarianism: "man"/society and mechanisms are assumed to interact on the basis of equalised complexity levels

2.2.2.1 Difference by human exceptionalism: "man"/society uniqueness

Examples: Idealism in theological positions, humanities ("Humans are sentient – robots are corpses")*



2.2.2.2 Difference by technological exceptionalism: machine uniqueness

Examples: Technophilia in Trans- and Posthumanism ("Technology will outperform more and more human functions"), Singularitarianism



2.2.2.3 Indifference by "man"/society-machine egalitarianism: equality of humans and technology

Examples: Flat ontologies in Actor-Network-Theory ("actants")*, Sociomaterialism ("intra-action")**

ACTOR-NETWORK THEORY



Matter feels,
converses, suffers,
desires, yearns and
remembers

Karen Barad



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AARHUS UNIVERSITY

GROUP 28-29
ACTOR-NETWORK THEORY

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2.2.3 Identity and difference of "man"/society and machine

	"Man"/society-machine models	
integration	dialectic: mechanisms are deemed to take part in raising the complexity of "man"/society, while as such having zero complexity	techno-social systemism: techno-social systems are assumed to emerge from social systems as soon as mechanisms are functionalised for the increase of social complexity in order to solve problems the complexity of which would otherwise overpower the system

2.2.3 Identity and difference of "man"/society and machine

Examples: Tools for conviviality*

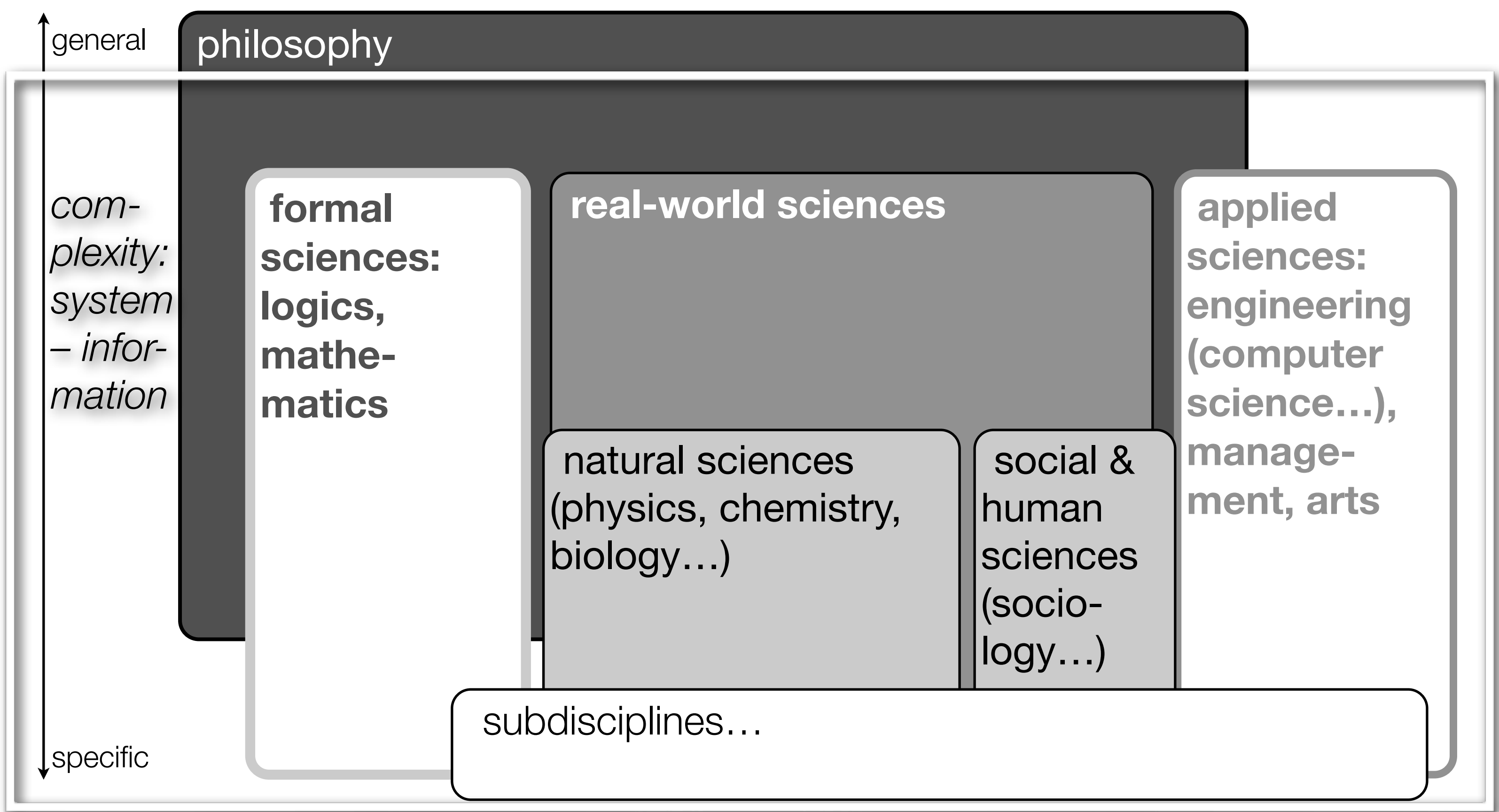


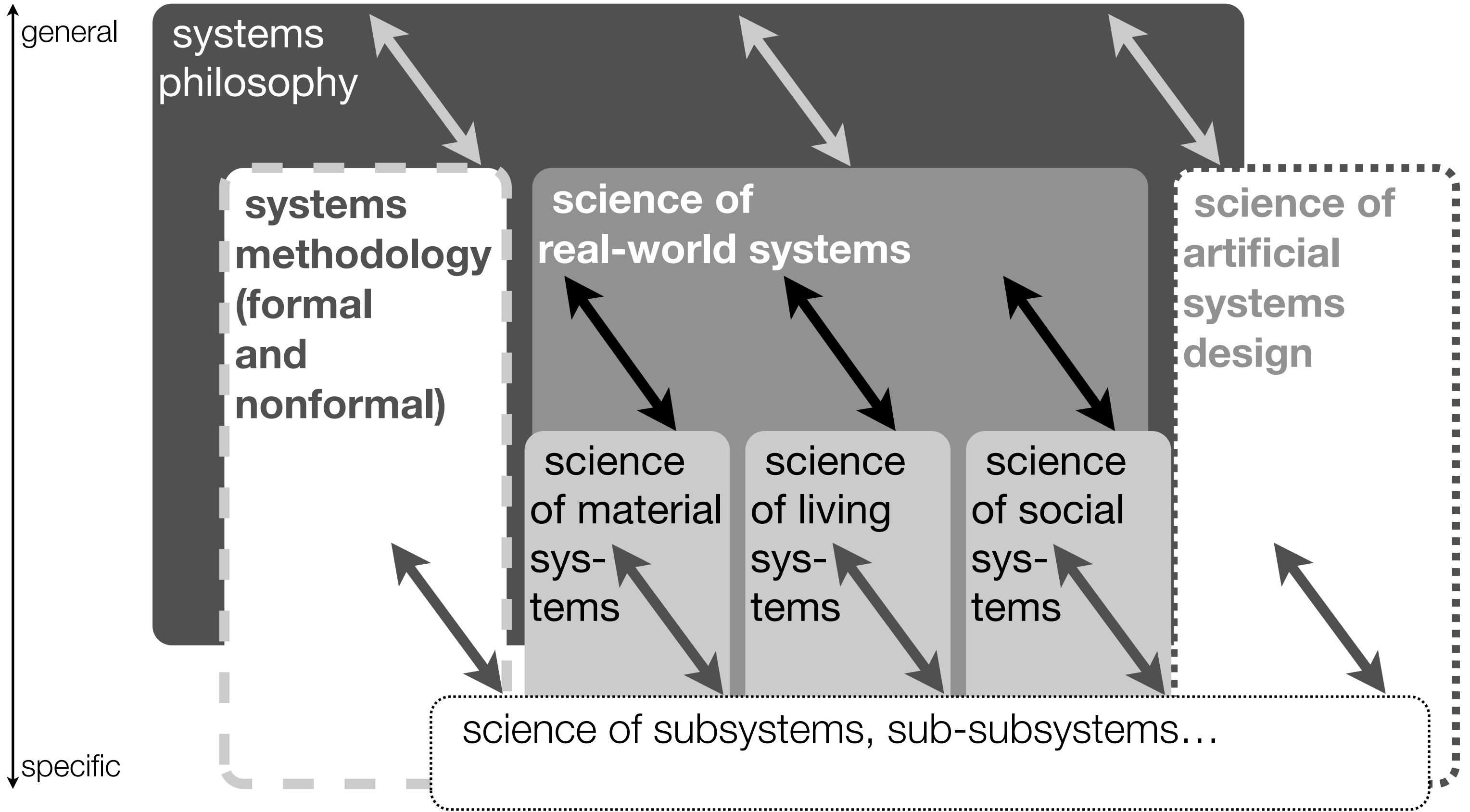
3 Science of Information and its place in the edifice of science(s)

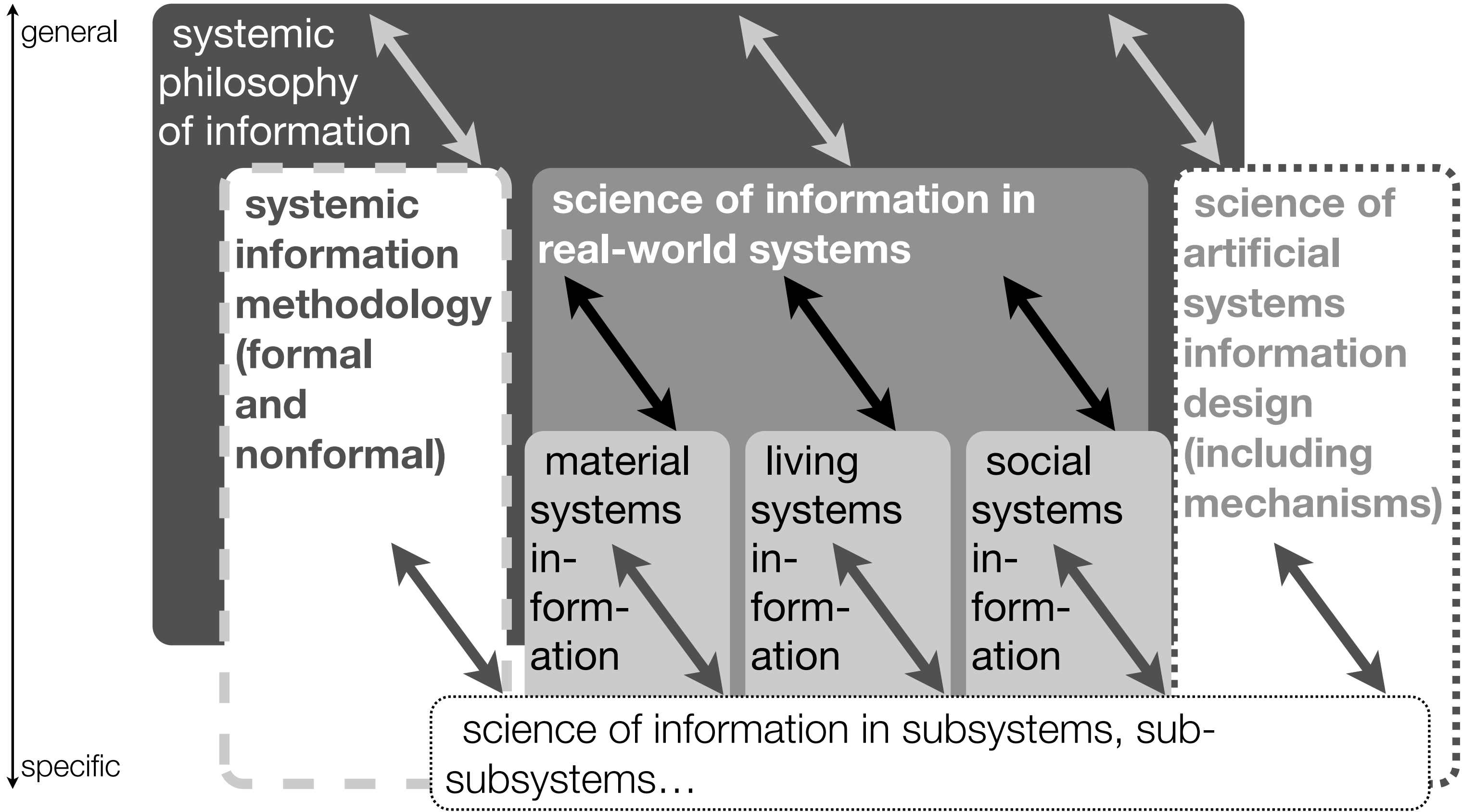
Systems thinking and the informational perspective reconceptualise the edifice of science(s):

Anything can be framed, modelled and designed

- in a **systemic** way, that is, as a **system** (or in the context of the dynamics or the architecture of systems), and, since self-organising systems are information-generating systems,
- in an **informational** way, that is, as an **informational agent** (or in the context of the dynamics or the architecture of informational agents), as well; each according to their **evolutionary stage**.







3 Science of Information and its place in the edifice of science(s)

On the basis of **UTI** (systemic informationism), **Science of Information** can **cross diverse disciplines** and **transcend them upwards to metalevels for unification** in order to flesh out the theoretical specification hierarchy of empirical information manifestations:

- the disciplinary borders can become **permeable** and
- the lower and higher levels can enter a **bottom-up and top-down loop** so as to be open to adopting changing findings and insights when attempting a consistent picture of the whole.

Thank you.