

# Information as Relation and Structure

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Understanding Matter

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# Content

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## 1 Self-Organisation

- 1.1 Ludwig v. Bertalanffy's "Relations of Organisation" in Living Systems
- 1.2 Aristotle's Four Causes Revisited
- 1.3 Multi-Stage Model of Evolutionary Systems

## 2 Information

- 2.1 Pierpaolo Donati's "Relational Effect" in Social Systems
- 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted
- 2.2 Triple-C Model (Cognition – Communication – Co-Operation)

# 1 Self-Organisation

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## 1.1 Ludwig v. Bertalanffy's "Relations of Organisation" in Living Systems

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As opposed to the analytical, summative and machine theoretical viewpoints, organismic conceptions<sup>1</sup> have evolved in all branches of modern biology which assert the necessity of investigating not only parts but also relations of organisation resulting from a dynamic interaction and manifesting themselves by the difference in behaviour of parts in isolation and in the whole organism.

– L. v. Bertalanffy: An Outline of General System Theory. In: British Journal for the Philosophy of Science, Vol. 1, No. 2, 1950, pp. 219-220 –

## 1.2 Aristotle's Four Causes Revisited

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cause 

caused

- **necessary** (bijective): strictly determined, mechanical
- **contingent** (not bijective): conditioned (by a necessary but not sufficient condition)

## 1.2 Aristotle's Four Causes Revisited

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### **Superposition of efficient and final cause**

efficient cause →

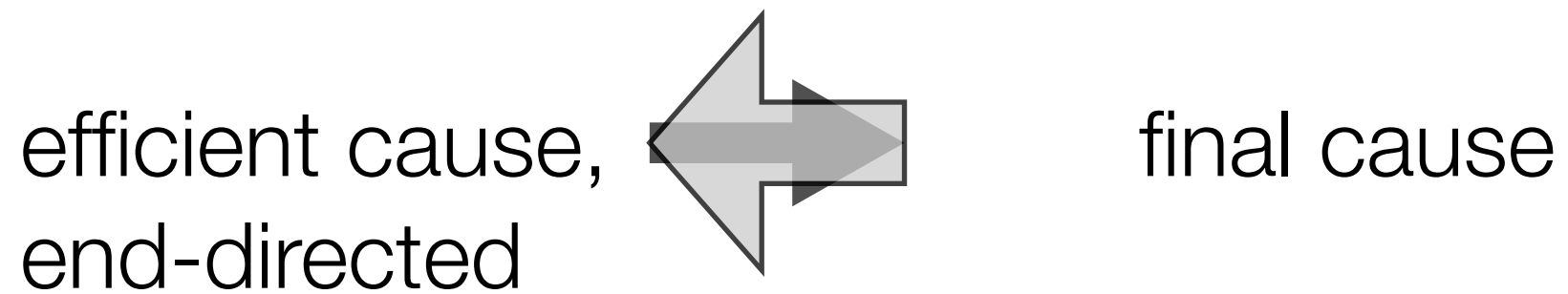
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*diachrony*

## 1.2 Aristotle's Four Causes Revisited

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### **Superposition of efficient and final cause**



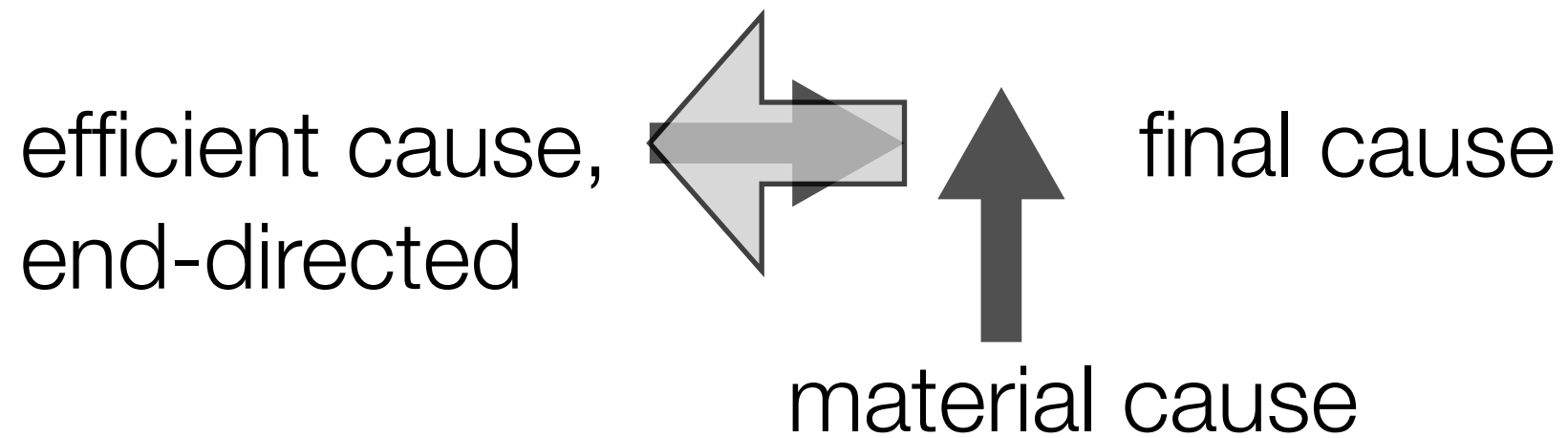
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*diachrony*

## 1.2 Aristotle's Four Causes Revisited

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### **Superposition of efficient and final cause**



*syn-  
chrony*

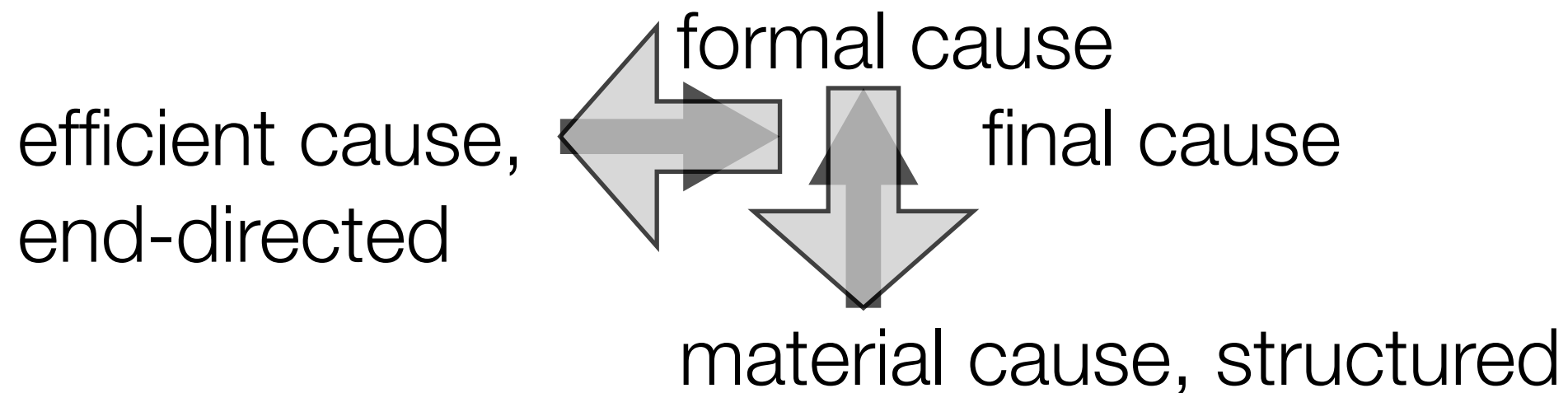
*diachrony*



## 1.2 Aristotle's Four Causes Revisited

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**Superposition of efficient and final cause  
as well as material and formal cause**

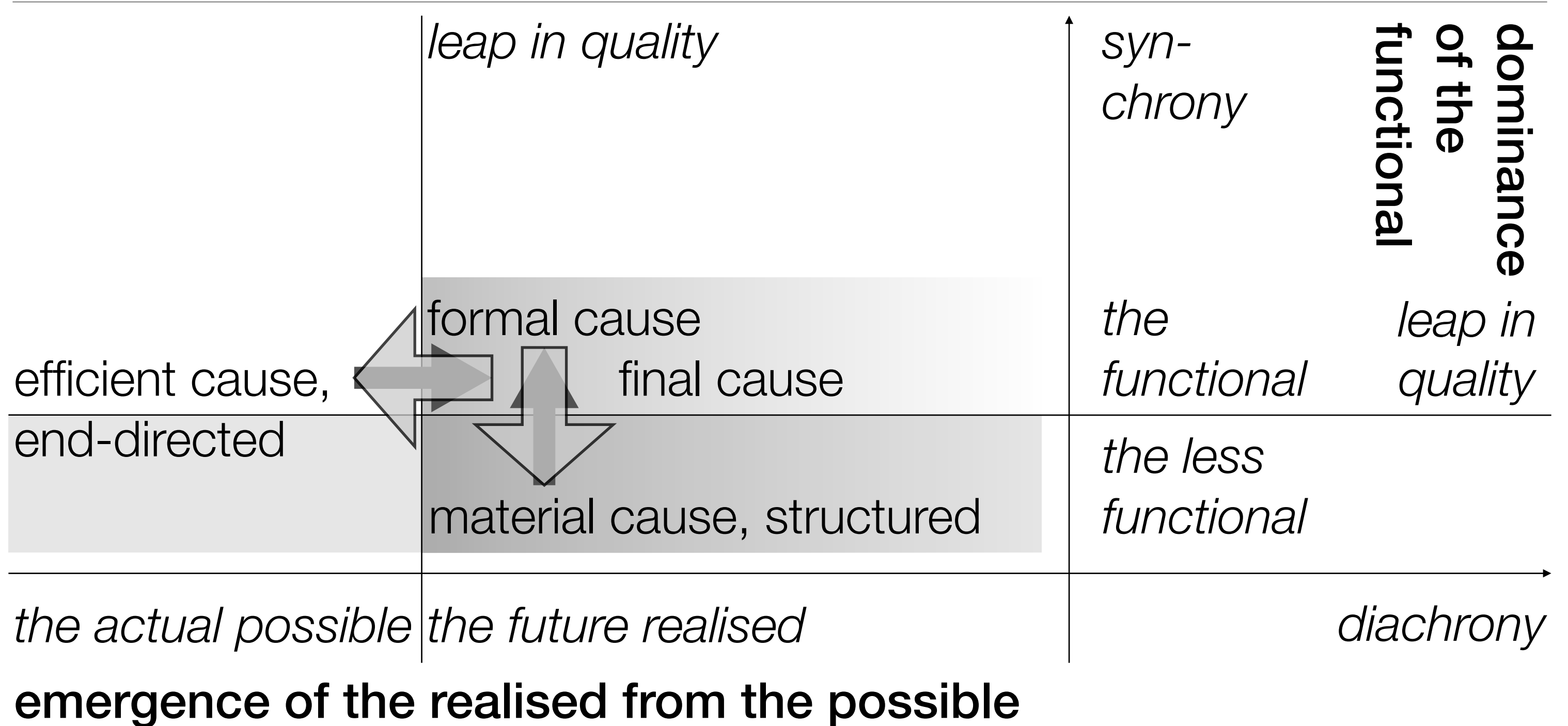


*syn-  
chrony*

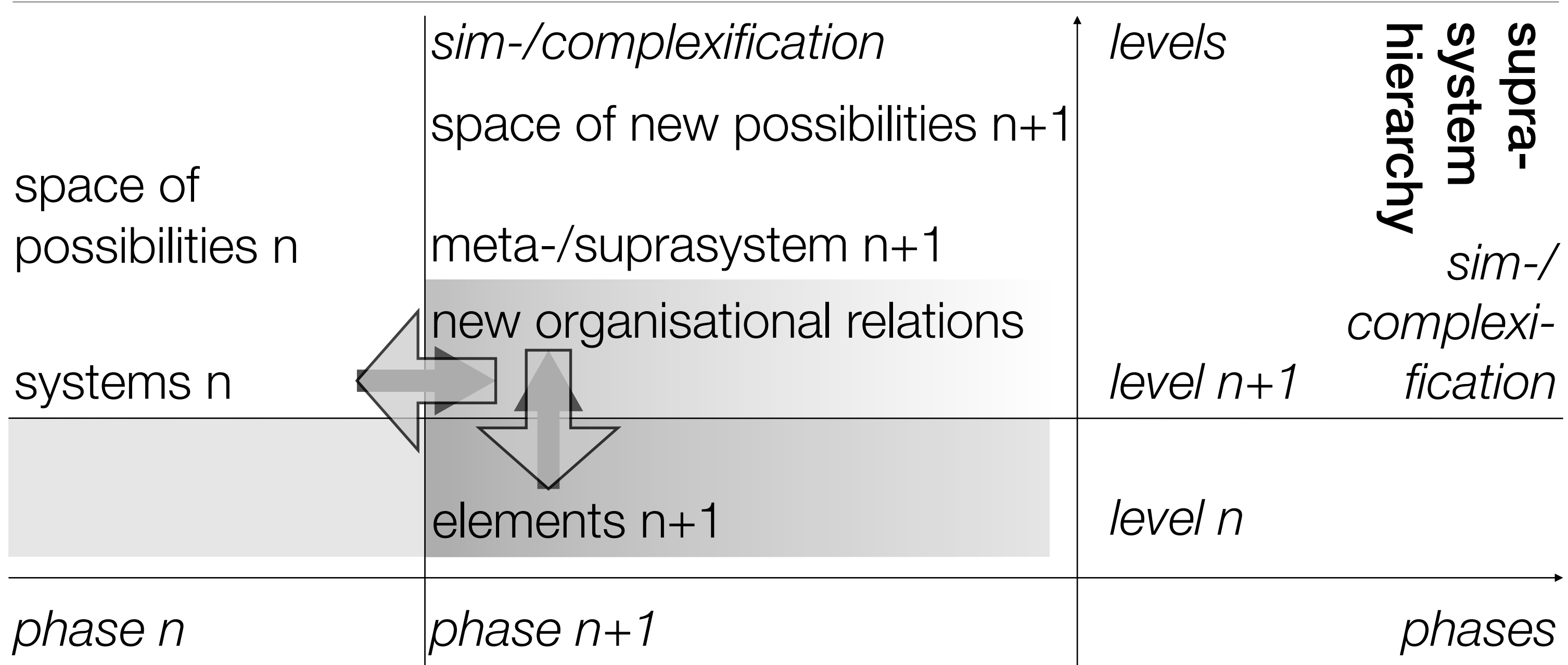
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*diachrony*

# 1.3 Multi-Stage Model of Evolutionary Systems



# 1.3 Multi-Stage Model of Evolutionary Systems



**meta-system transition**

## 1.3 Multi-Stage Model of Evolutionary Systems

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### Conclusion:

- everything is matter, progressively organised – from material systems to living material systems to social living material systems; the difference between different manifestations of matter is different organisation!

## 2 Information

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## 2.1 Pierpaolo Donati's "Relational Effect" in Social Systems

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In short, an analysis of the classical sociologists leads me to derive the following three semantics of the social relation:

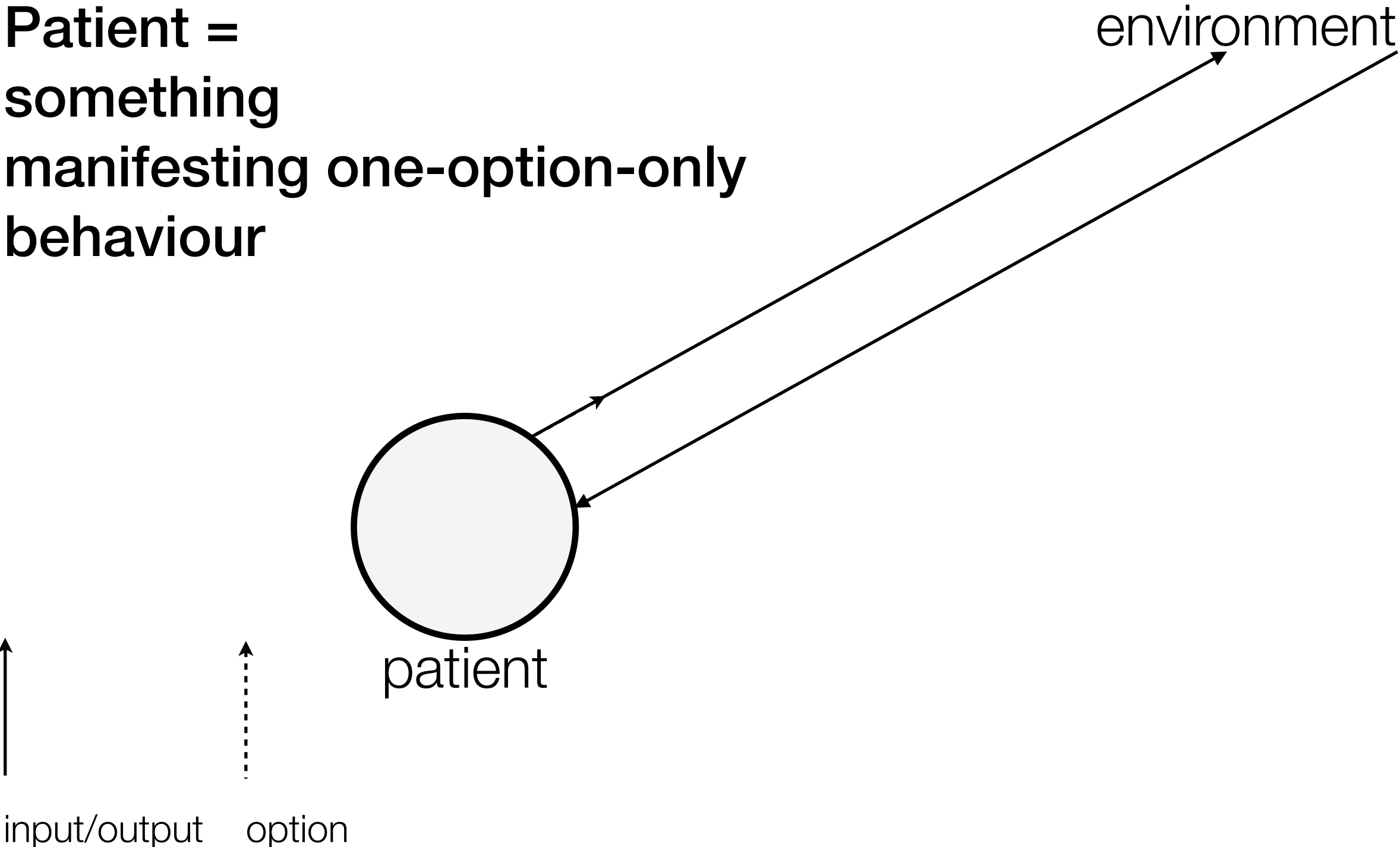
- (i) the semantics of the relation as *refero*, that is, as a symbolic reference starting from a motivation;<sup>4</sup>
- (ii) the semantics of the relation as *religo*, that is, as a bond, deriving from the structural connection constituted by norms and means;<sup>5</sup>
- (iii) the generative semantics of the relation as an emergent phenomenon (relational effect). Here the relation between Ego and Alter is understood as an effect of reciprocity that takes on a form (its own reality) endowed with its own qualities and causal powers,<sup>6</sup>

– P. Donati: Morphogenetic Society and the Structure of Social Relations. In: M. Archer (ed.), Late Modernity, 2014, pp. 144-145 –

# 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

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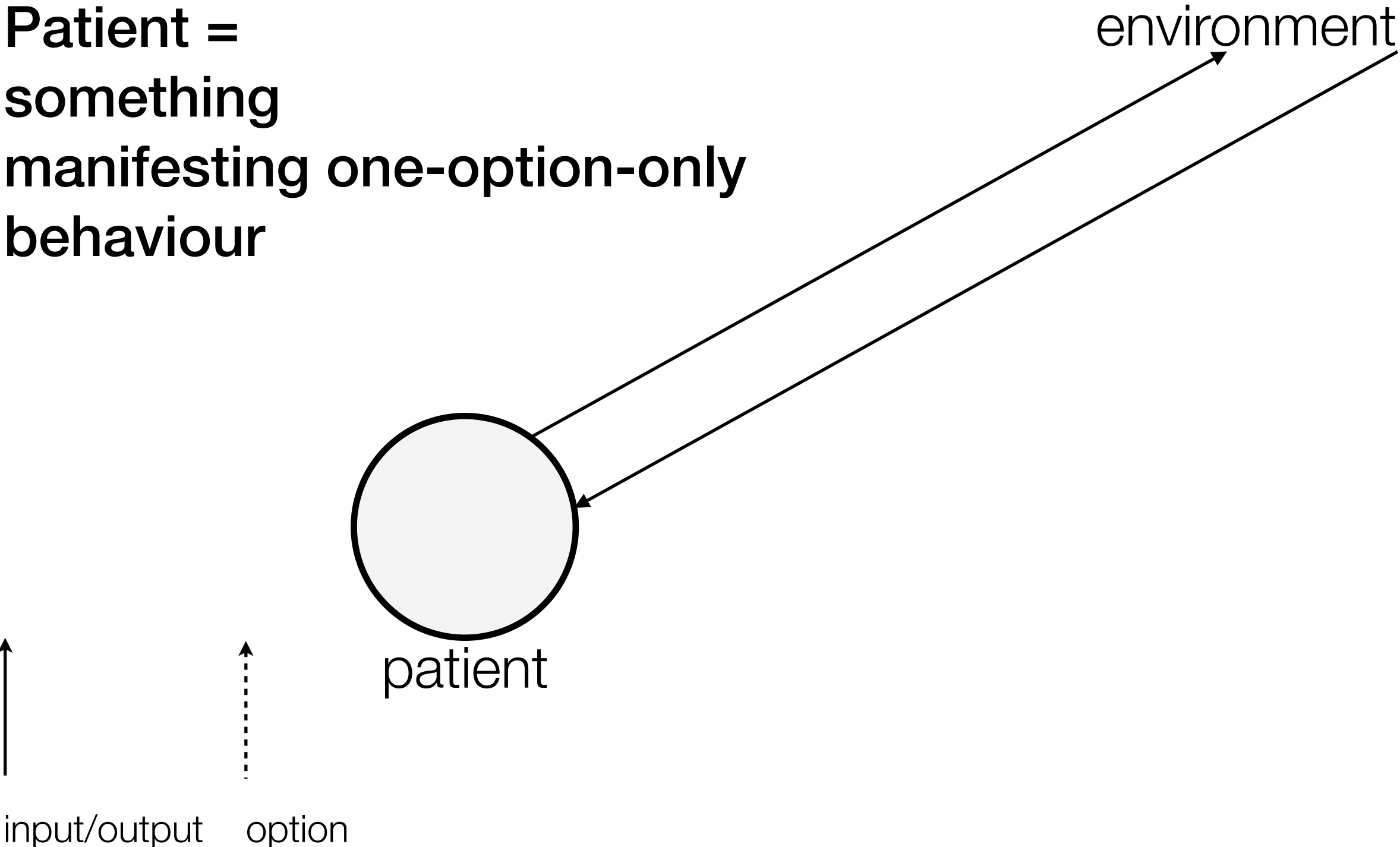
**Patient =  
something  
manifesting one-option-only  
behaviour**



# 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

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

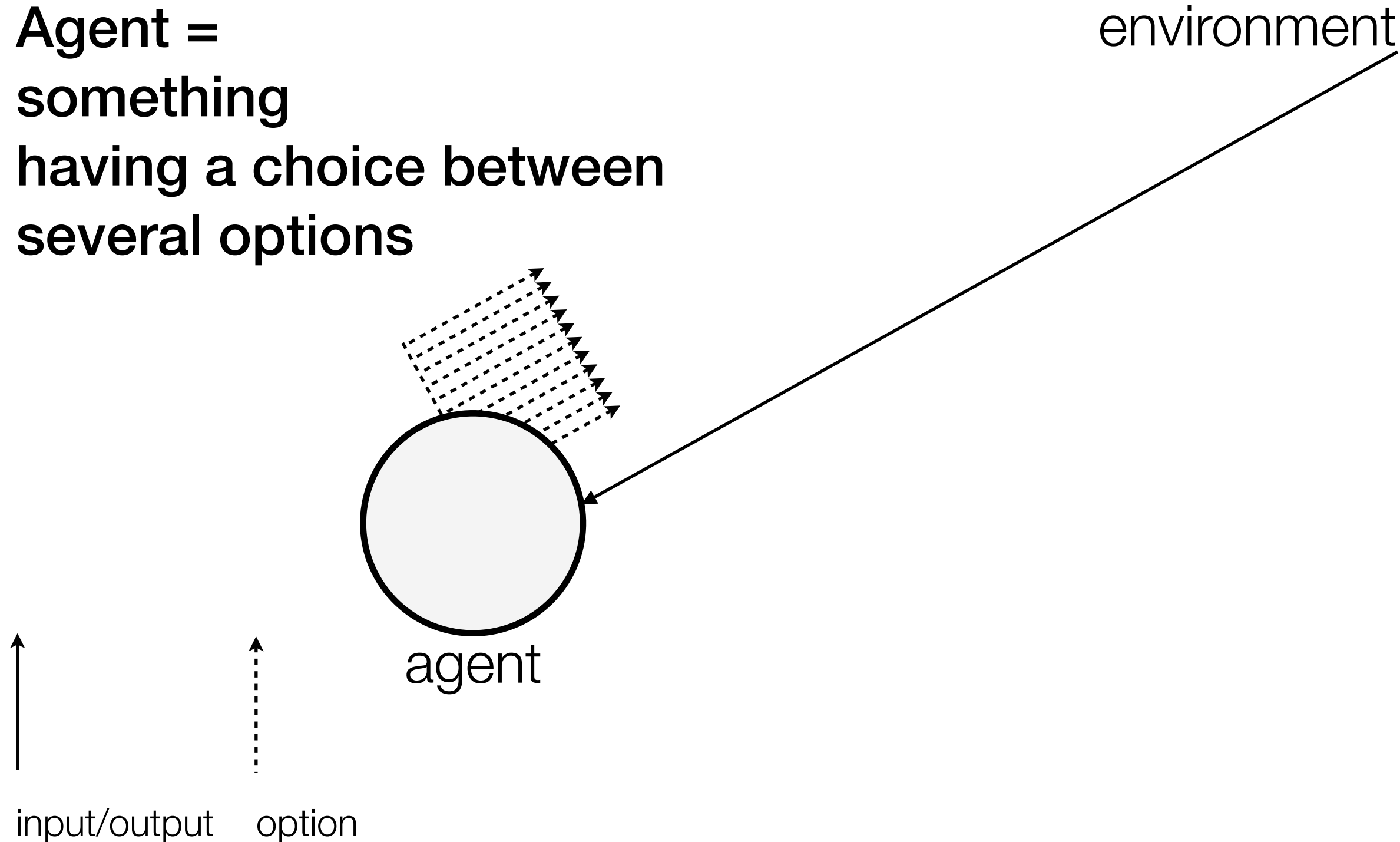




## 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

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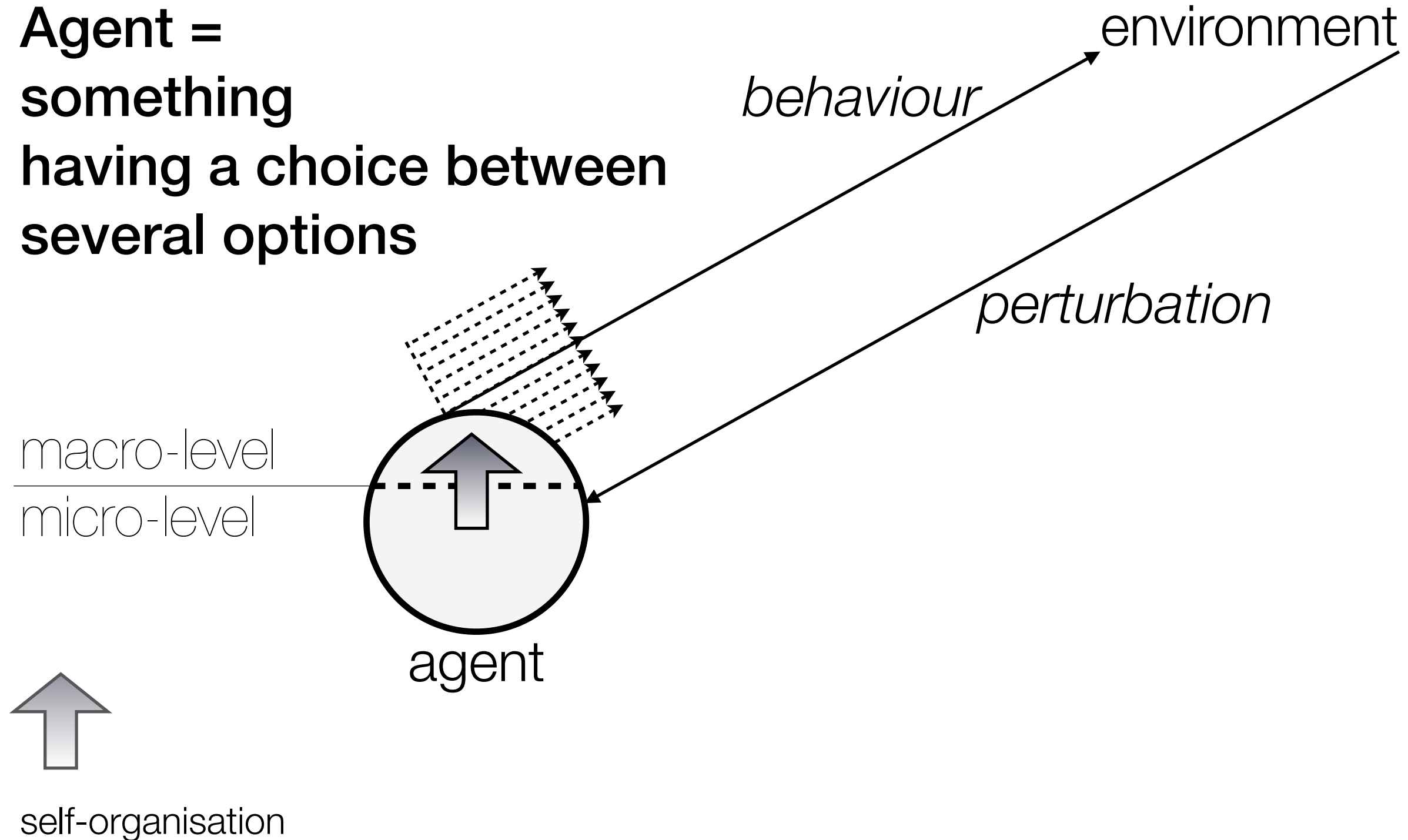
**Agent =  
something  
having a choice between  
several options**



## 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

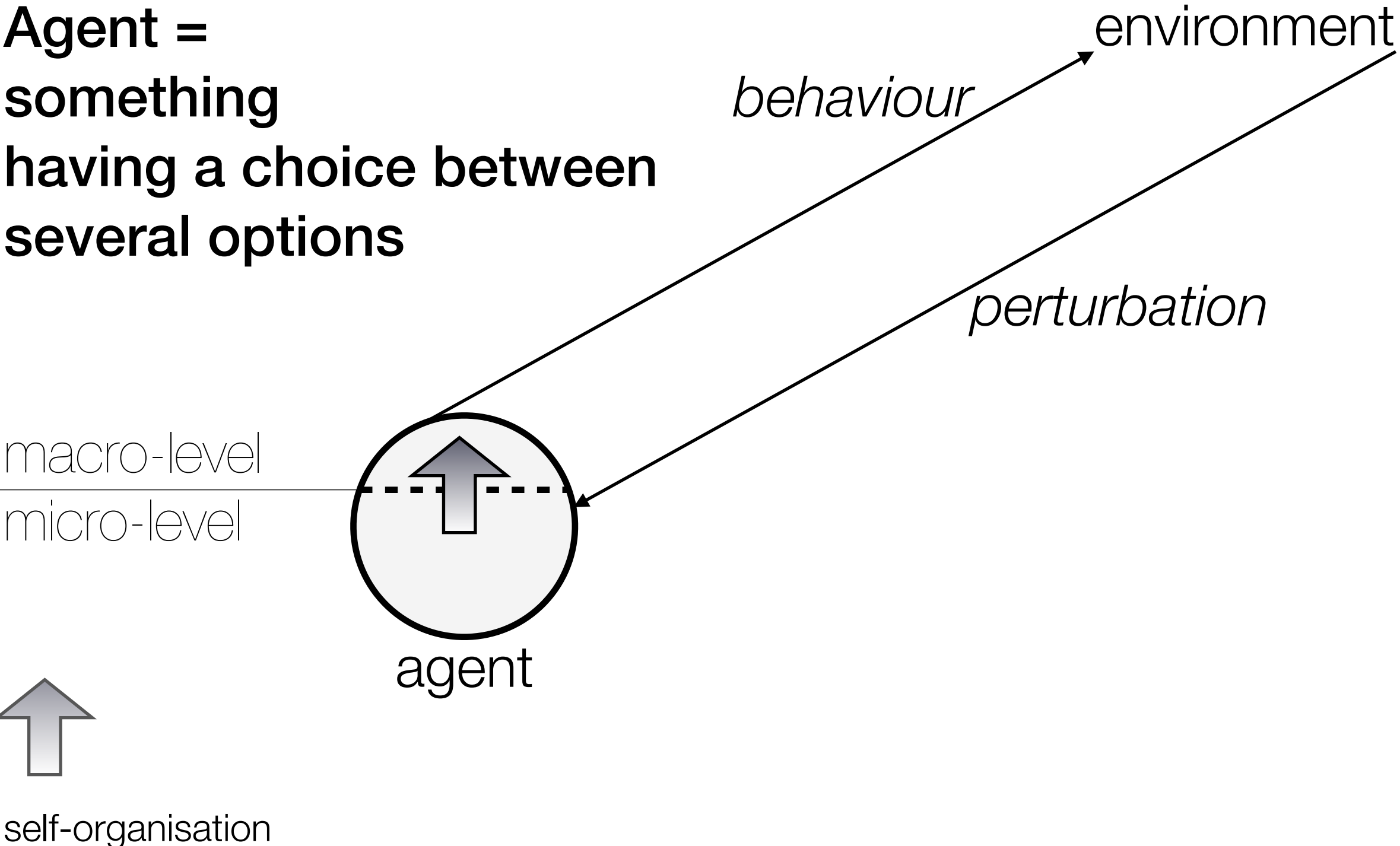
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**Agent =  
something  
having a choice between  
several options**



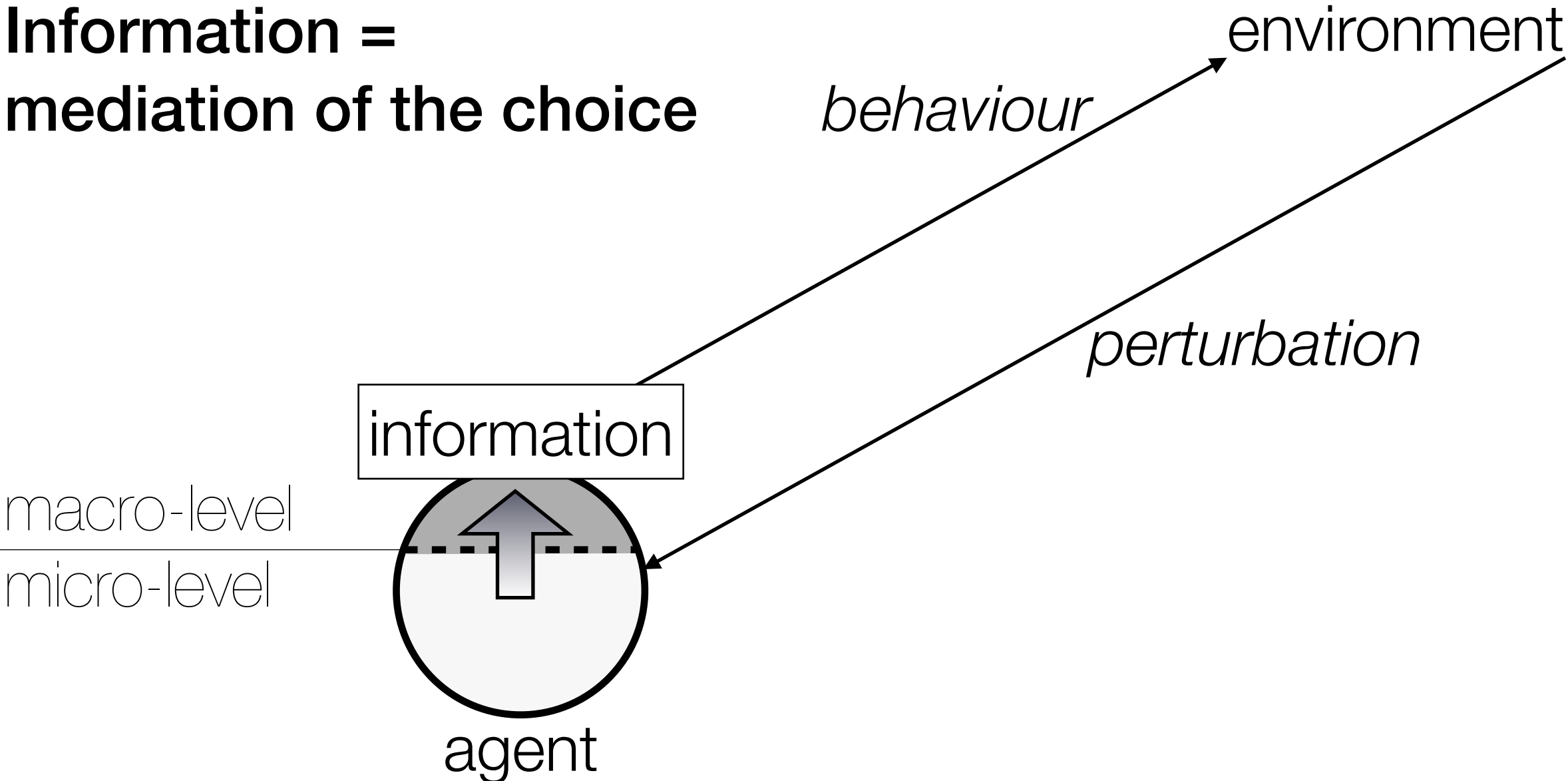
# 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

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



# 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

**Information =  
mediation of the choice**

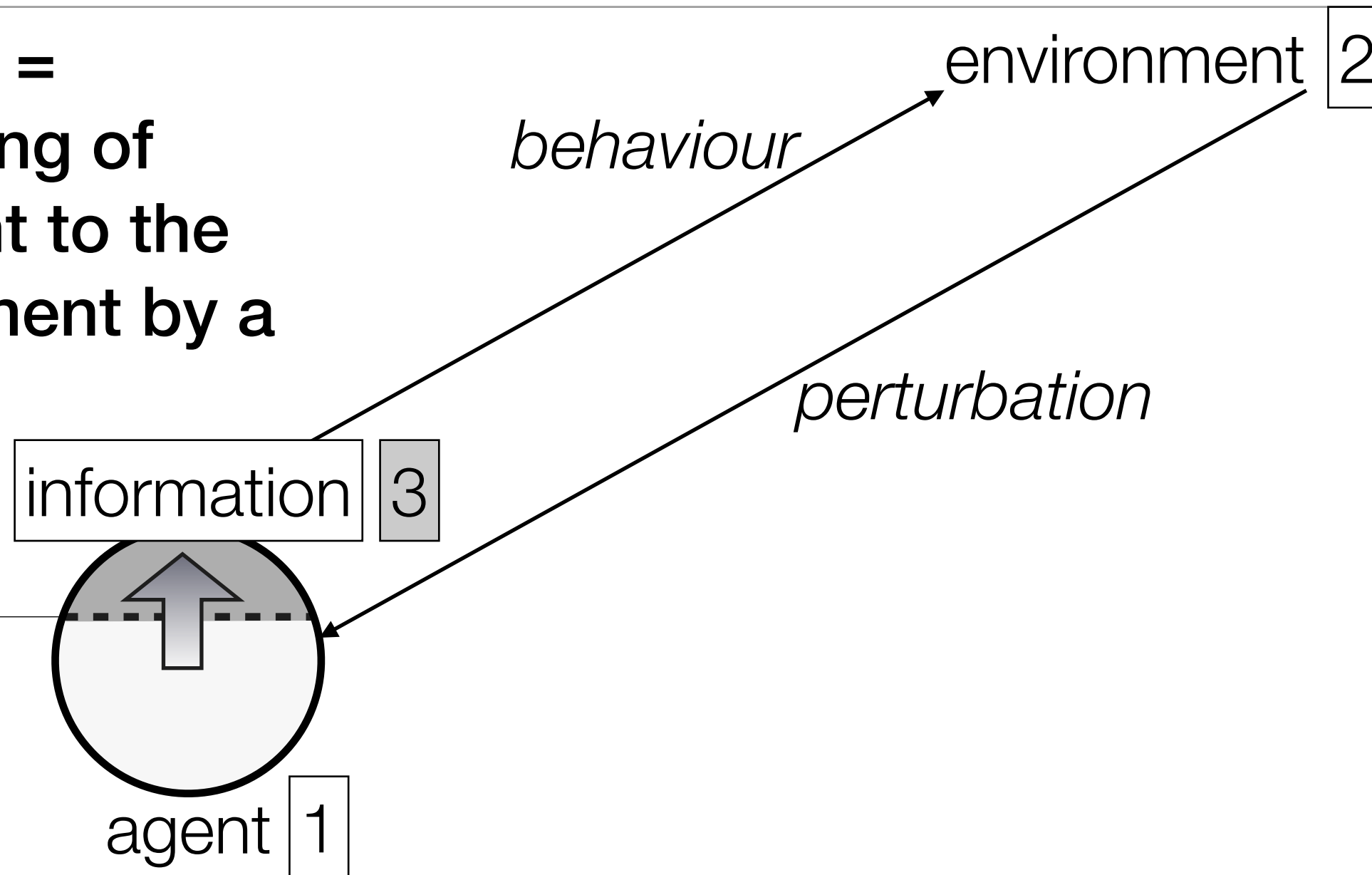


self-organised order = generated/utilised information (mediator)

## 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

**Information =**  
**re-positioning of**  
**(1) the agent to the**  
**(2) environment by a**  
**(3) "third"**

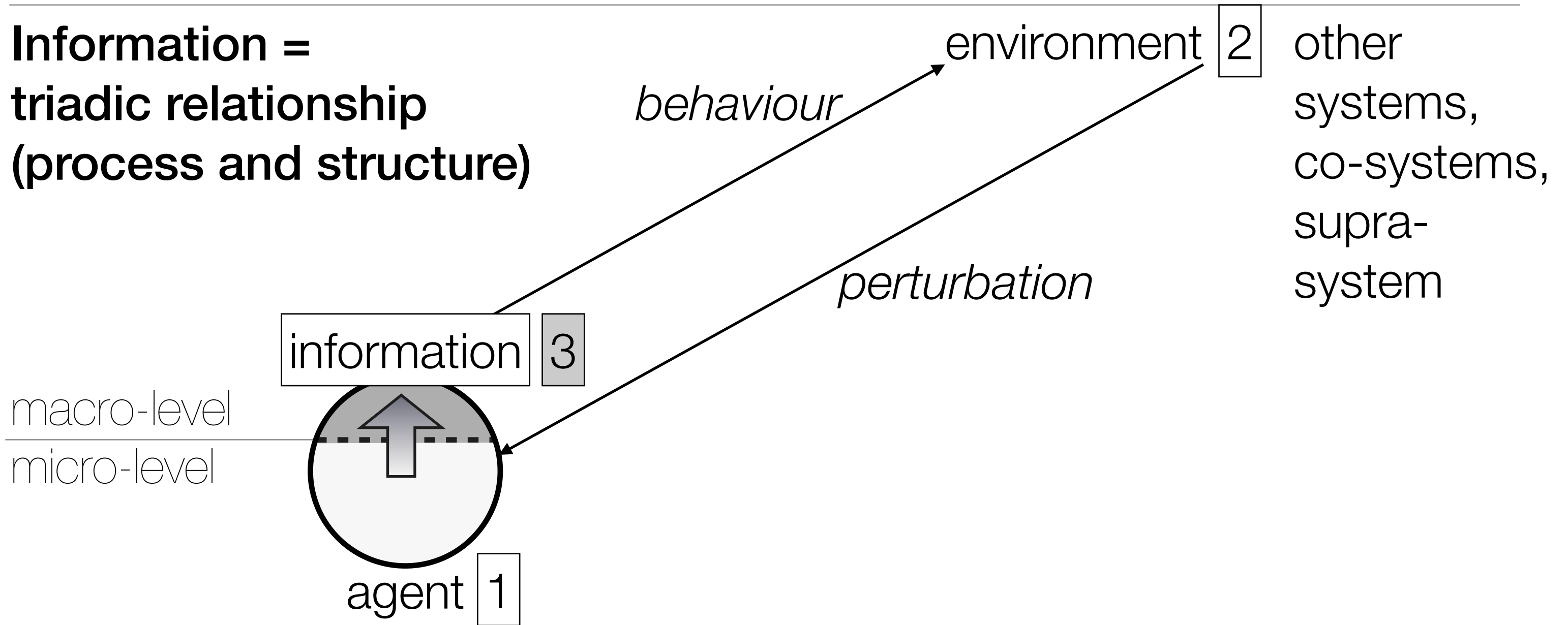
macro-level  
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micro-level



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

## 2.2 Rafael Capurro's Agents vs. Patients Taken for Granted

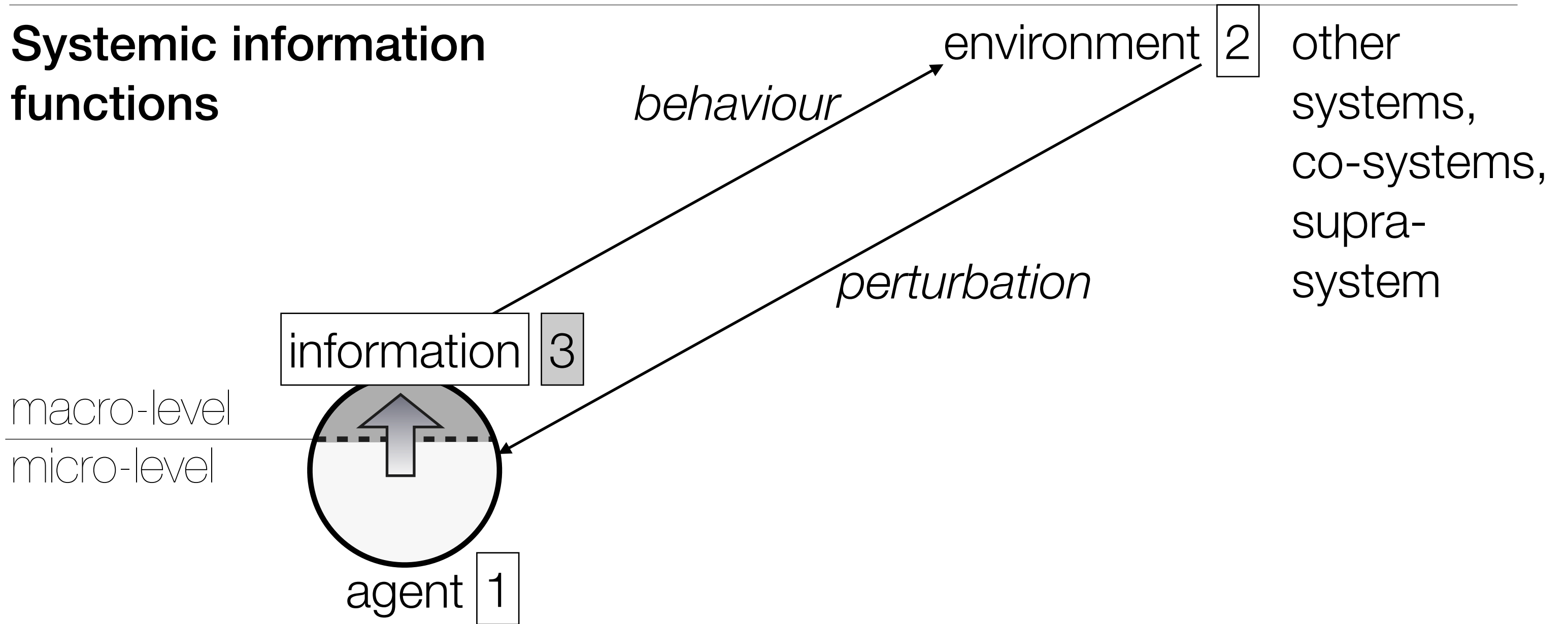
**Information =  
triadic relationship  
(process and structure)**



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

## 2.3 Triple-C Model (Cognition – Communication – Co-Operation)

### Systemic information functions



self-organised order = generated/utilised information

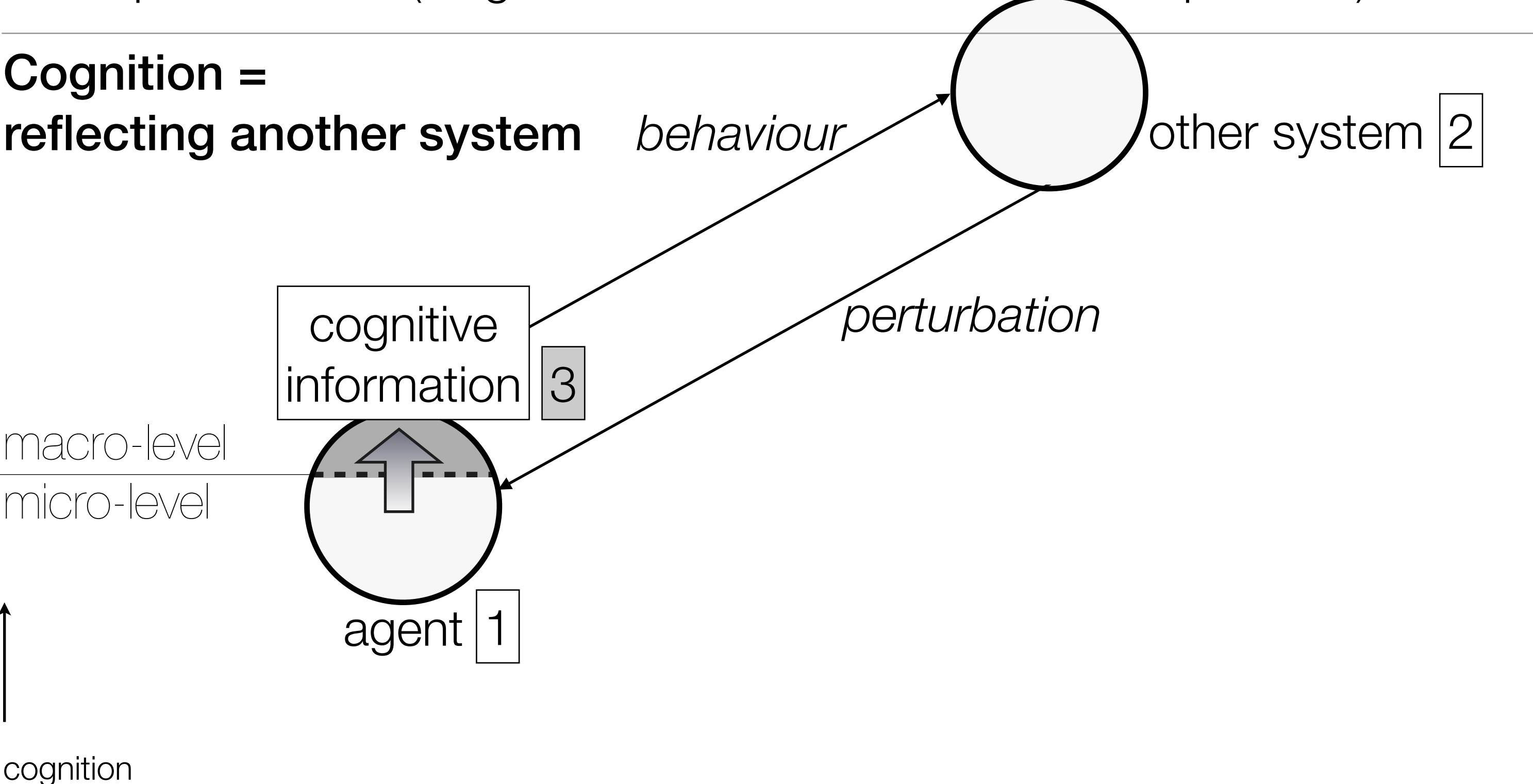
# 2.3 Triple-C Model (Cognition – Communication – Co-Operation)

**Cognition =  
reflecting another system**

*behaviour*

other system

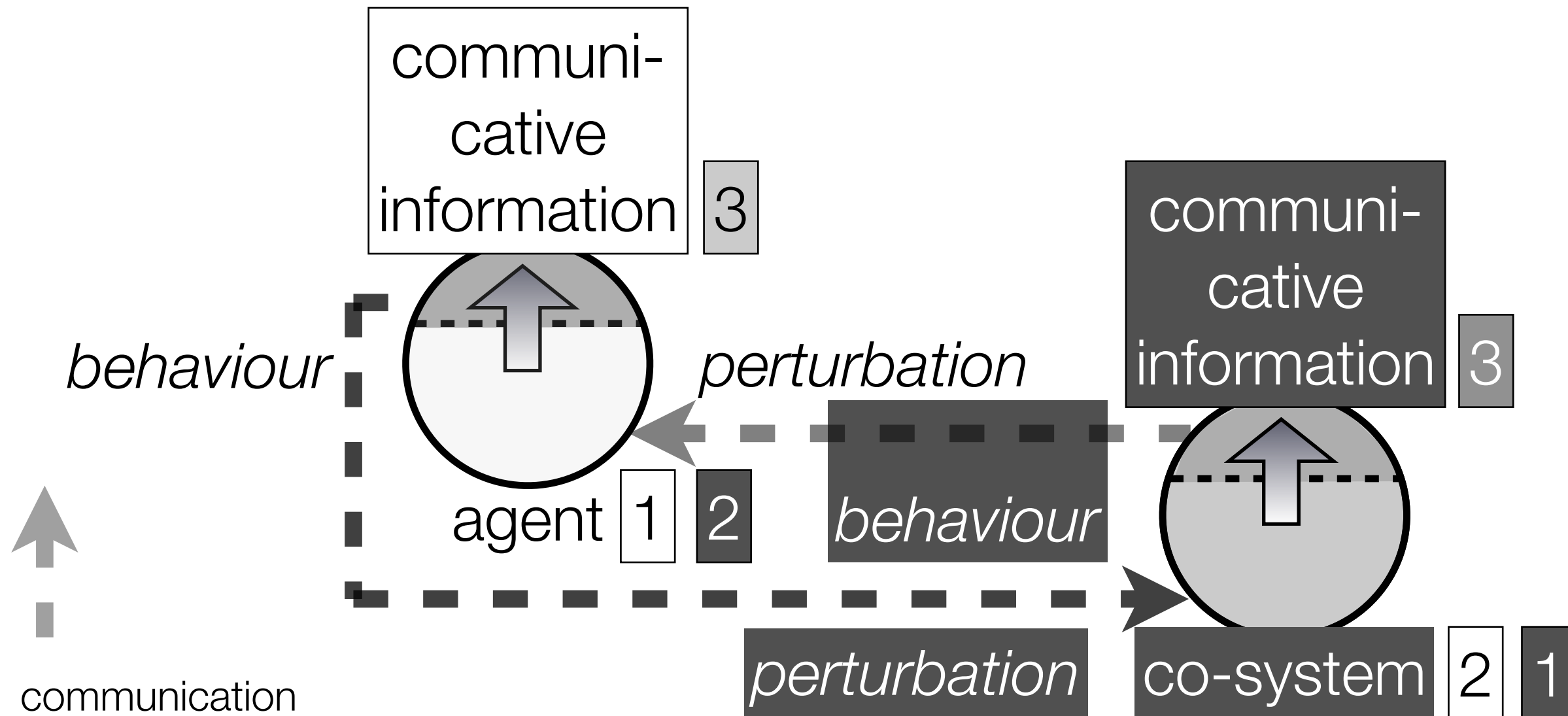
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## 2.3 Triple-C Model (Cognition – Communication – Co-Operation)


**Communication =  
coupling cognitive co-systems**

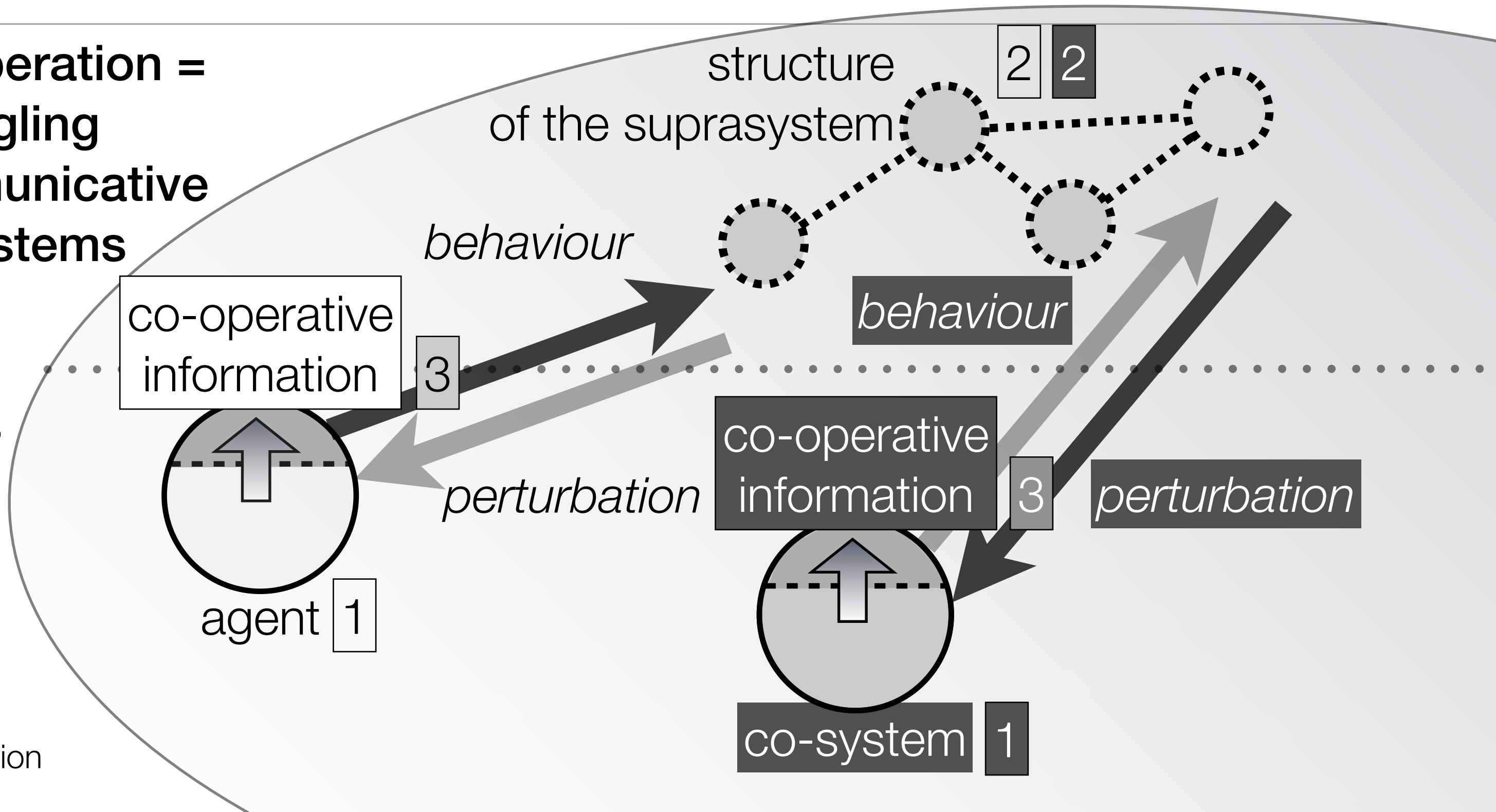


## 2.3 Triple-C Model (Cognition – Communication – Co-Operation)

**Co-operation =  
entangling  
communicative  
co-systems**

**I  
(ele-  
ments  
view)**

  
co-operation

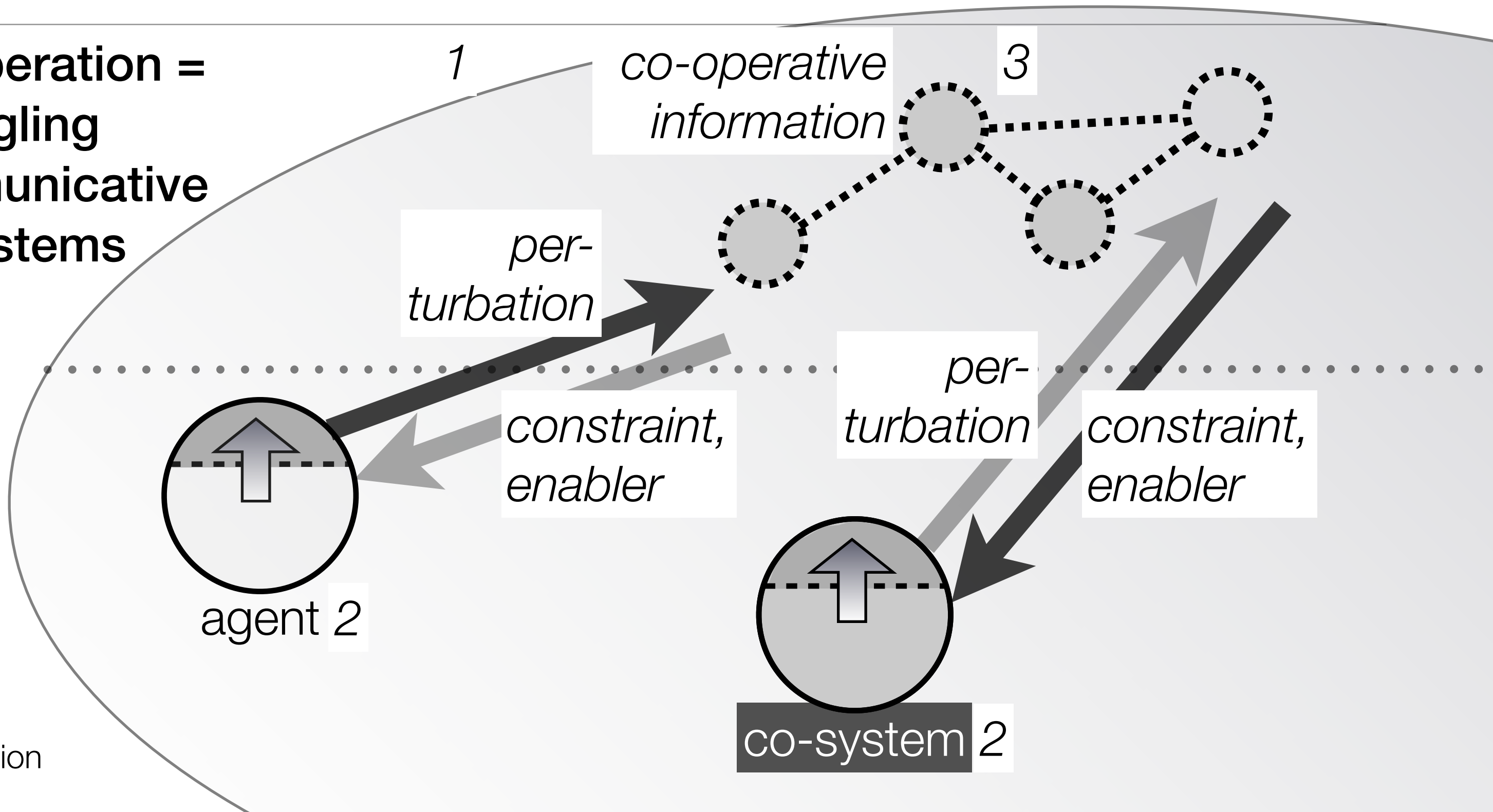


## 2.3 Triple-C Model (Cognition – Communication – Co-Operation)

**Co-operation =  
entangling  
communicative  
co-systems**

**II  
(sys-  
tems  
view)**

↑  
co-operation



## 2.3 Triple-C Model (Cognition – Communication – Co-Operation)

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### Conclusion:

- the organisation of matter is produced by informational agents according to different information generation/utilisation capabilities, evolving from primordial self-organising systems to human/social systems