SOCIAL SIMULATIONS AND SOCIAL REALITY

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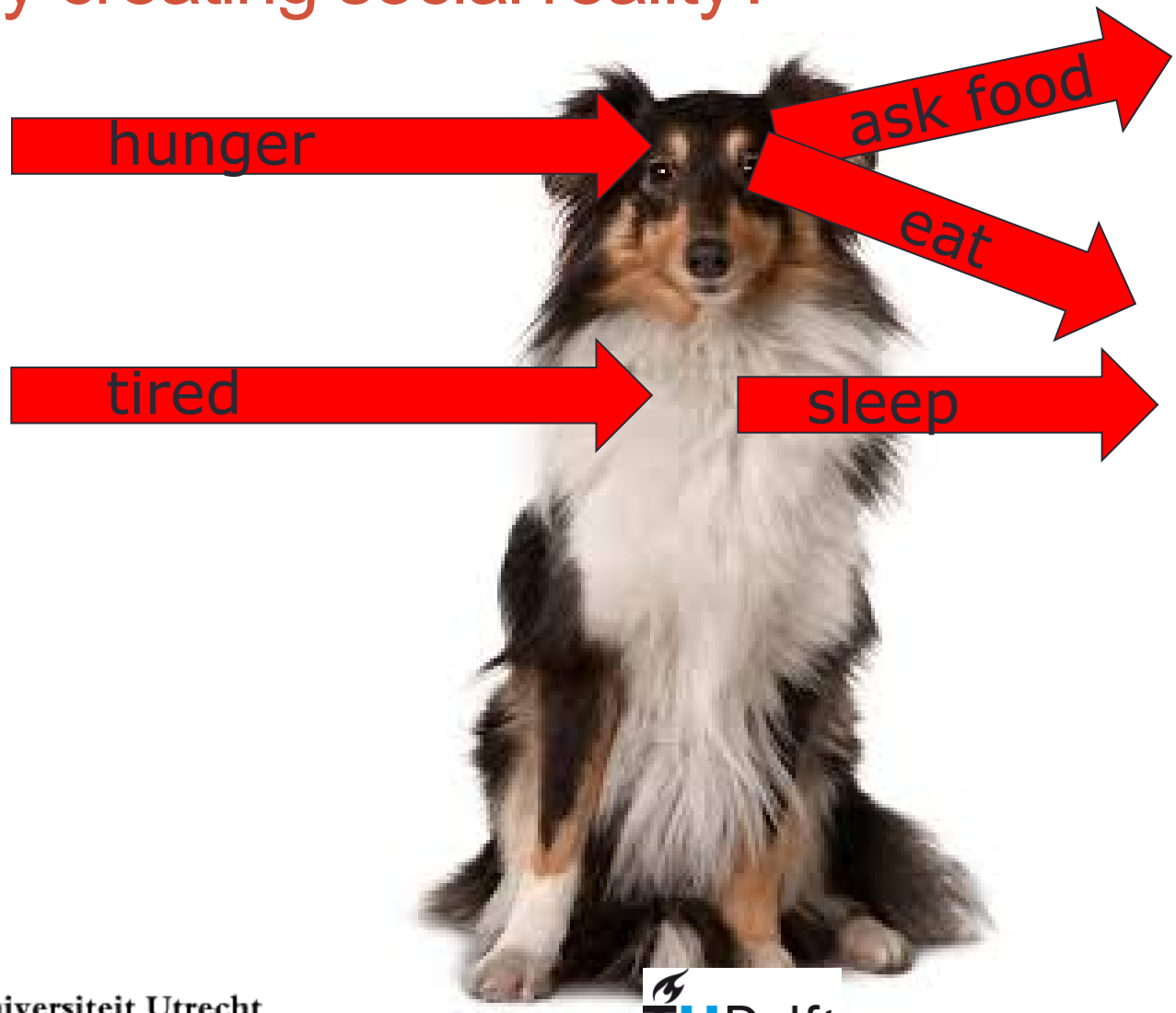
Outline

- Social Reality
- Norms
- Values
- Social Practices
- Conclusions

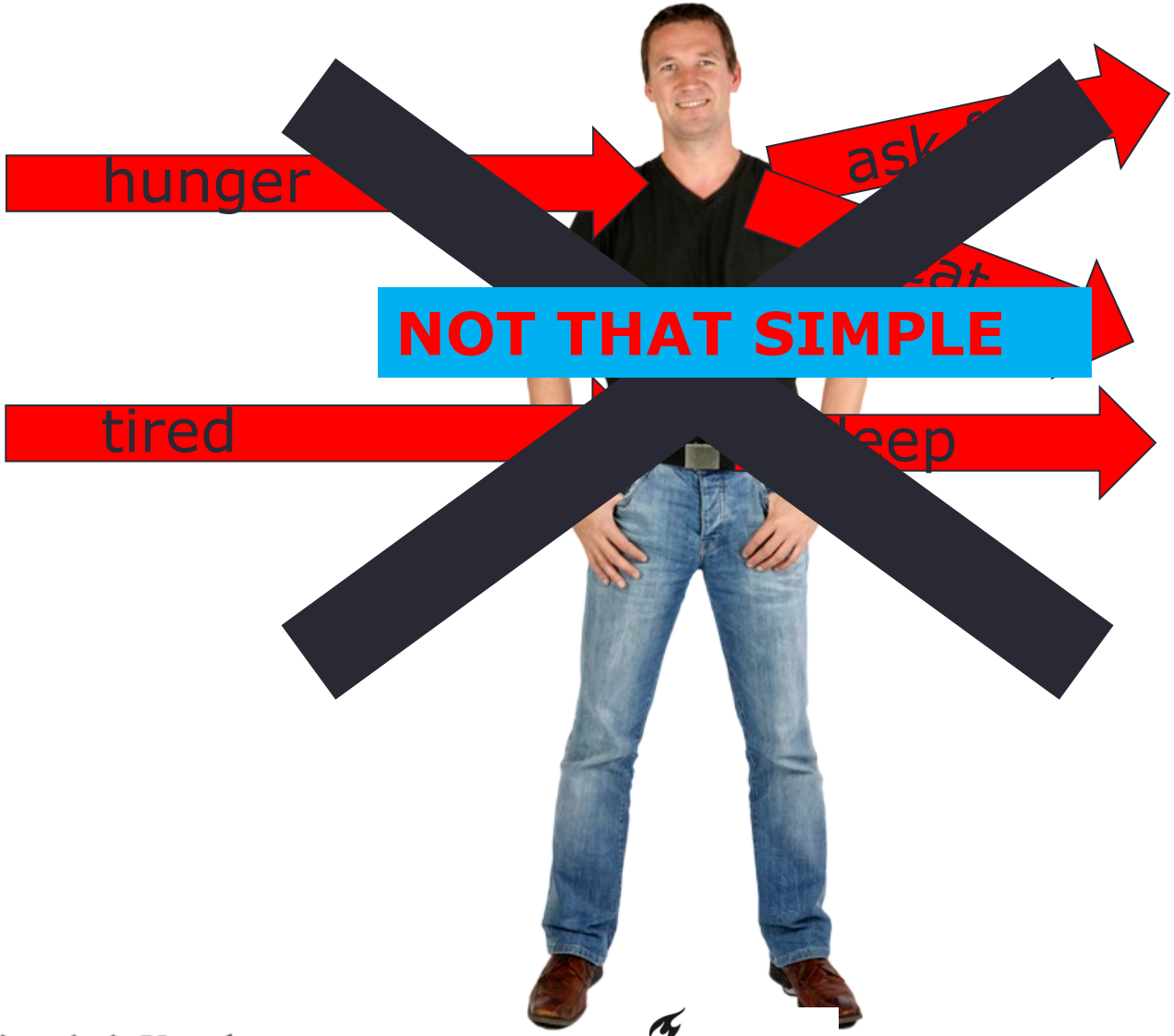
Social reality

1. Creating social reality
2. Social landscape
3. Social “laws”
4. Interdependencies between social and functional/physical
5. Social practices

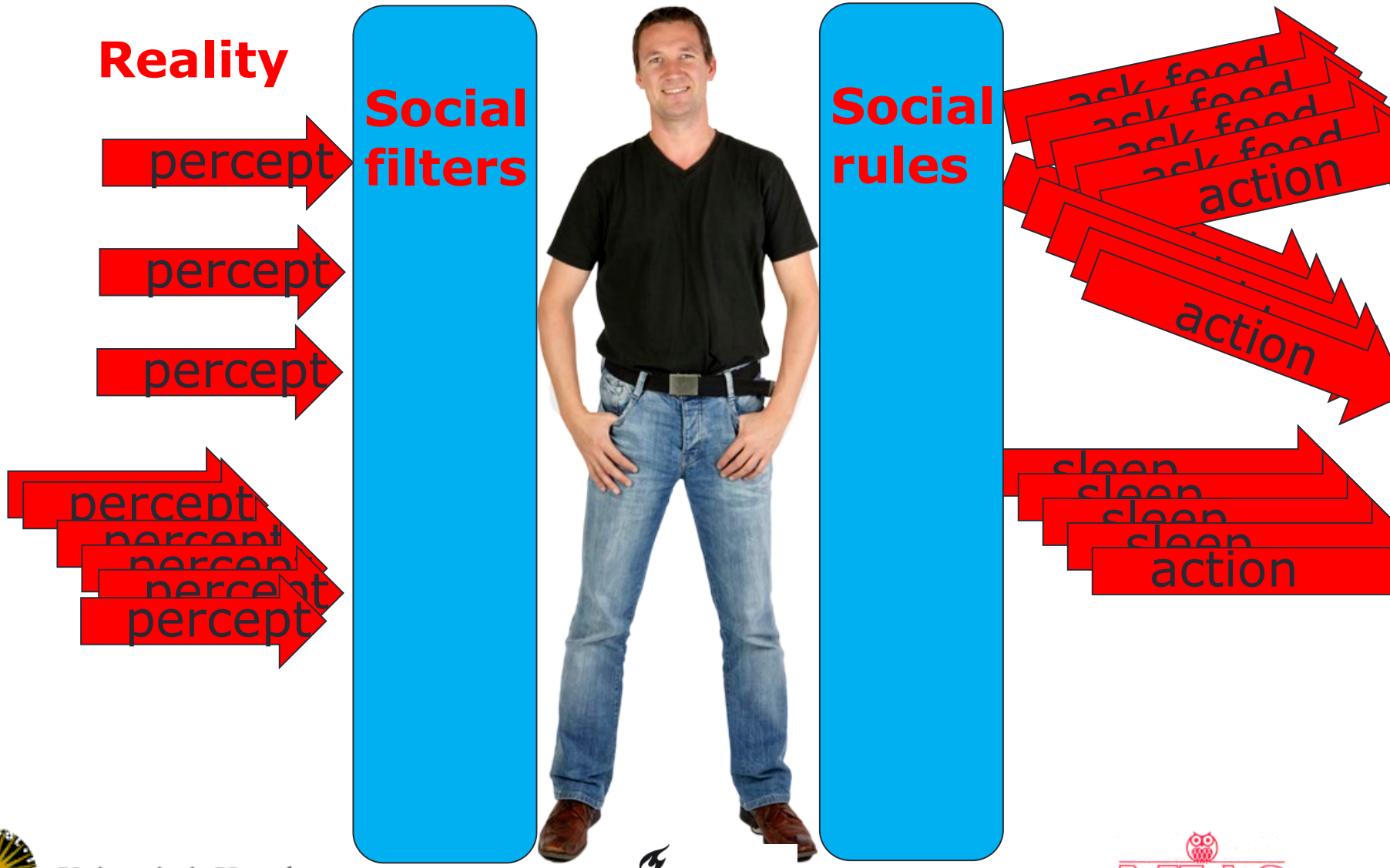
Why creating social reality?



Why creating social reality?



Why creating social reality?



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Social structures motivate behavior

- Identity and perception of identity is (partially) determined by group membership
- People are member of many formal and informal groups (social structures)
- These memberships all influence the behavior:
  - Role in a group
  - Relations to members of a different group
  - Aspiring a certain role or position in a group
  - …

- Often these influences are all expressed in terms of norms
- Social structures are needed to model the relations, priorities and preferences between norms

Social structures and information exchange

- Social structures determine with whom we communicate
- Social structures determine when we communicate
- Social structures determine how the communication is interpreted

E.g.

- Tell a colleague about possible fraud at work
- Tell the boss about possible fraud at the university
- Tell the tv about possible fraud at university

Cf. Social network analysis

Social structures and virtual agents

Social structures are an important aspect in human behavior

→

Social structures should be represented in virtual agent models

→

Norms play an important role in defining social structures

→

Norms should be used in virtual agents models

Norms can only be understood and modeled in the context of social structures

→

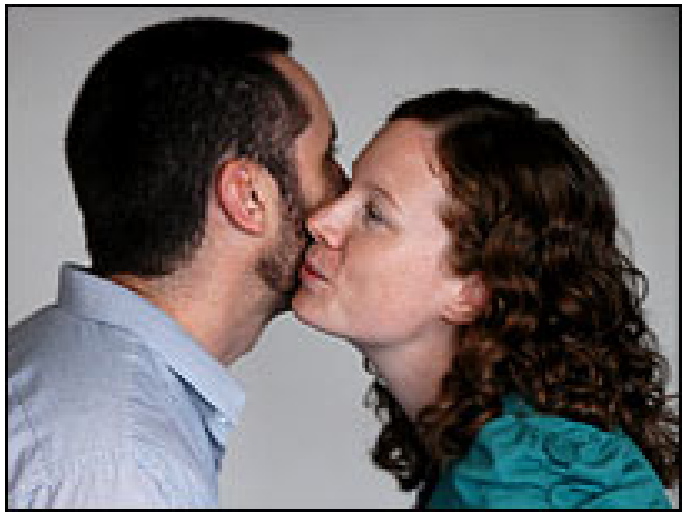
Social structures are very important for virtual agents

Social Reality and Physical Reality

Big friend → greet with hug

Social Reality and Physical Reality

Greeting at work

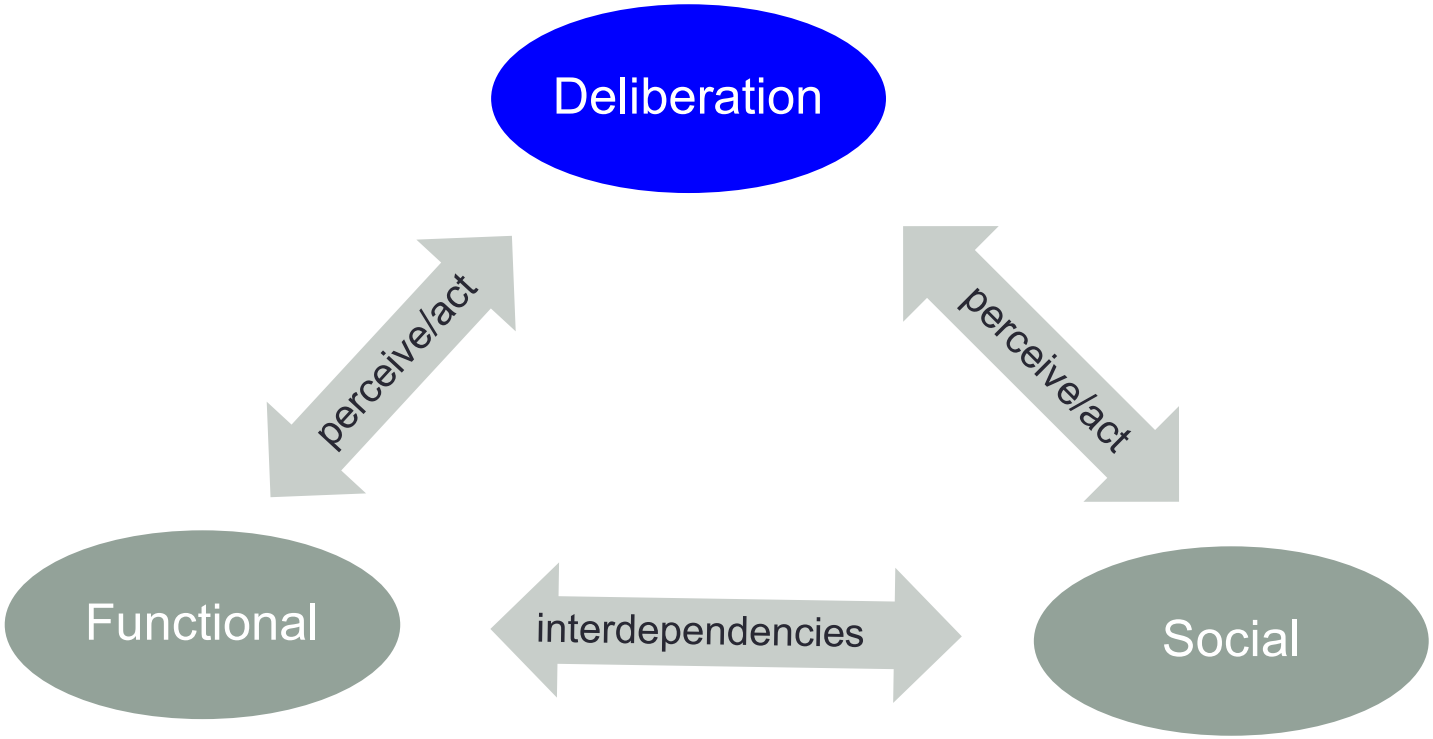


Portugal→ standard greeting

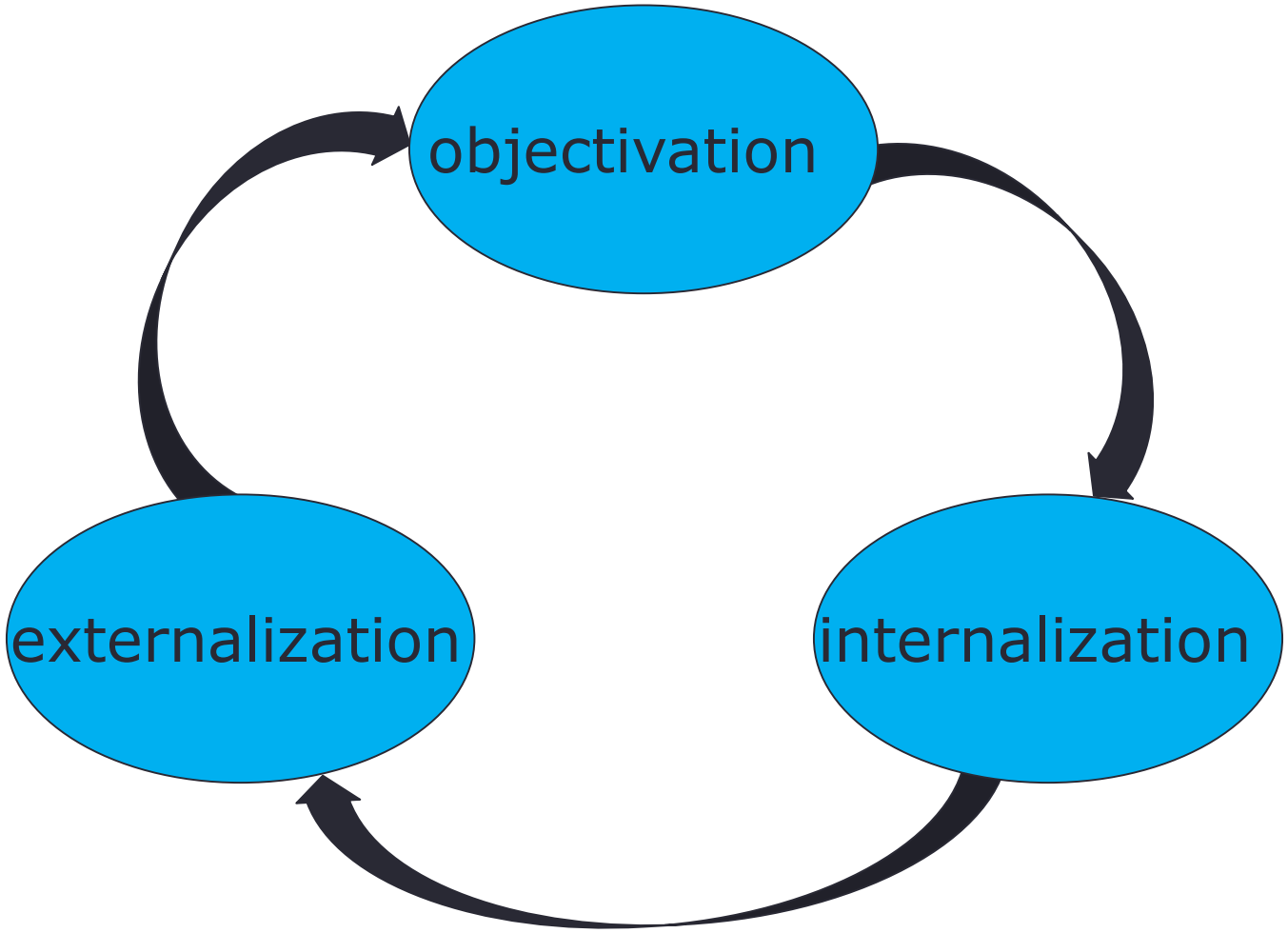
The Netherlands→ good friends

Israel→ inappropriate

Social deliberation



Creating Social Reality



Externalization

1. Create patterns of behavior
   - The patterns are based on context and individuals
   - They can change when individuals change or context changes
2. Actions are performed as “social actions”
   - Agents have “we” intentions

Objectivation

1. Name the patterns as objects in their own right
   - Here social reality is created!
   - The social structure now has an existence independent of the persons
   - The social structure can be transmitted easy, be discussed, etc.
2. The social structures are legitimized
   - Legitimization can be different from the reason the structure is created.
   - E.g.
   - Justification: coffee time is at 10:30 because it breaks the morning (9-12) nicely in two parts.
   - Reason: coffee time is at 10:30 because then the last person gets into work and we can have coffee together

(Social) reality persists with legitimation

Internalization

1. The social structure is used as a part of reality that has to be taken into account when deciding upon actions
2. Beliefs, norms, etc. become part of individual mental attitudes

Cause and Effect

1. Due to the cyclic nature of the influence between individual and social reality it is not clear what is the cause and what is the effect of certain phenomena.

E.g. In the playground soccer is the most popular activity because it can satisfy the largest set of motivations (achievement, power and affiliation).

Boys are physically a bit bigger than girls and thus better at playing soccer.

Because the boys achieve more at soccer they tend to play more soccer (and might even get better).

Mostly boys play the most popular activity (soccer).

Boys are the most popular children, because they can play the most popular activity best.

Boys are better than girls.

Cause and Effect

It is easy to draw wrong conclusions, based on limited observations.

But how far back does one have to go to get to the “real” origins of some social structures?

Social structures

- Formal social structures:
  - Institutions, Organizations, Nations,…
- Informal social structures:
  - Teams, Groups, Families, Friends,…

Social structures are described in terms of:

- Roles
- Relations and interaction (patterns)
- Norms
- Values
- Social Practices
- …

Modeling Social laws

No laws of nature but things like NORMS

Example:

You cannot drive more than 100km/hr

BUT NORMS CAN BE VIOLATED!

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How does Social Reality work?

1. When do we follow norms and when do we violate them?

2. How do norms arise?

3. Which norms are stable? How are they maintained?

4. Norms have many motivational and social aspects

   →

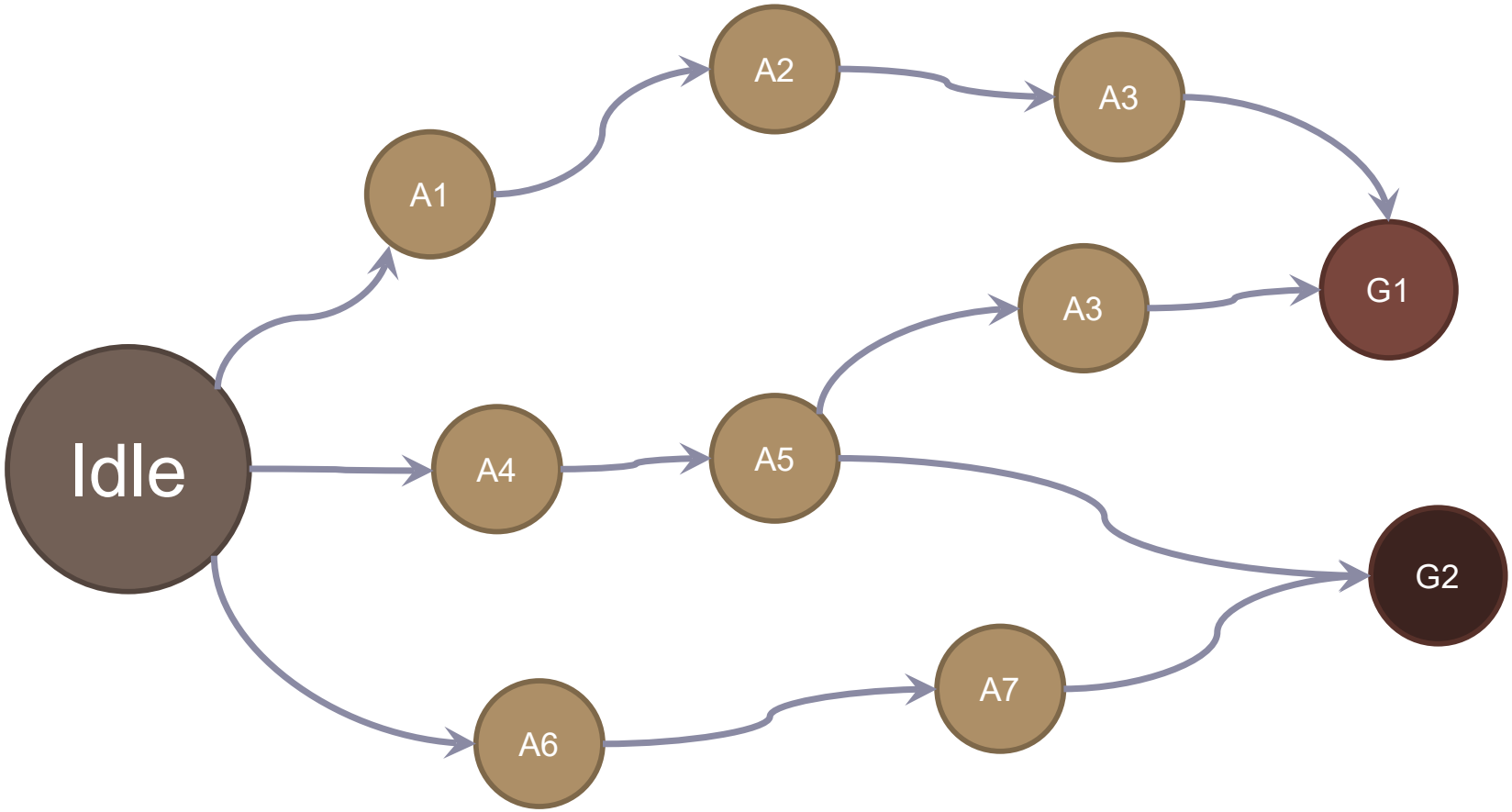
   Which aspects and how do we model them?

Social structures and norms

- The accountant of a company has to make sure the accounts of the company are correct
- The head of the department can order an employee to perform a task
- A "green" company has rules that force its employees to use public transport for business trips
- Academics do not wear suits
- In a collectivistic team all members committed to the agreed course of action
- If George Clooney drinks Nespresso I also have to drink Nespresso

Socially regulated

Policy regulated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A3
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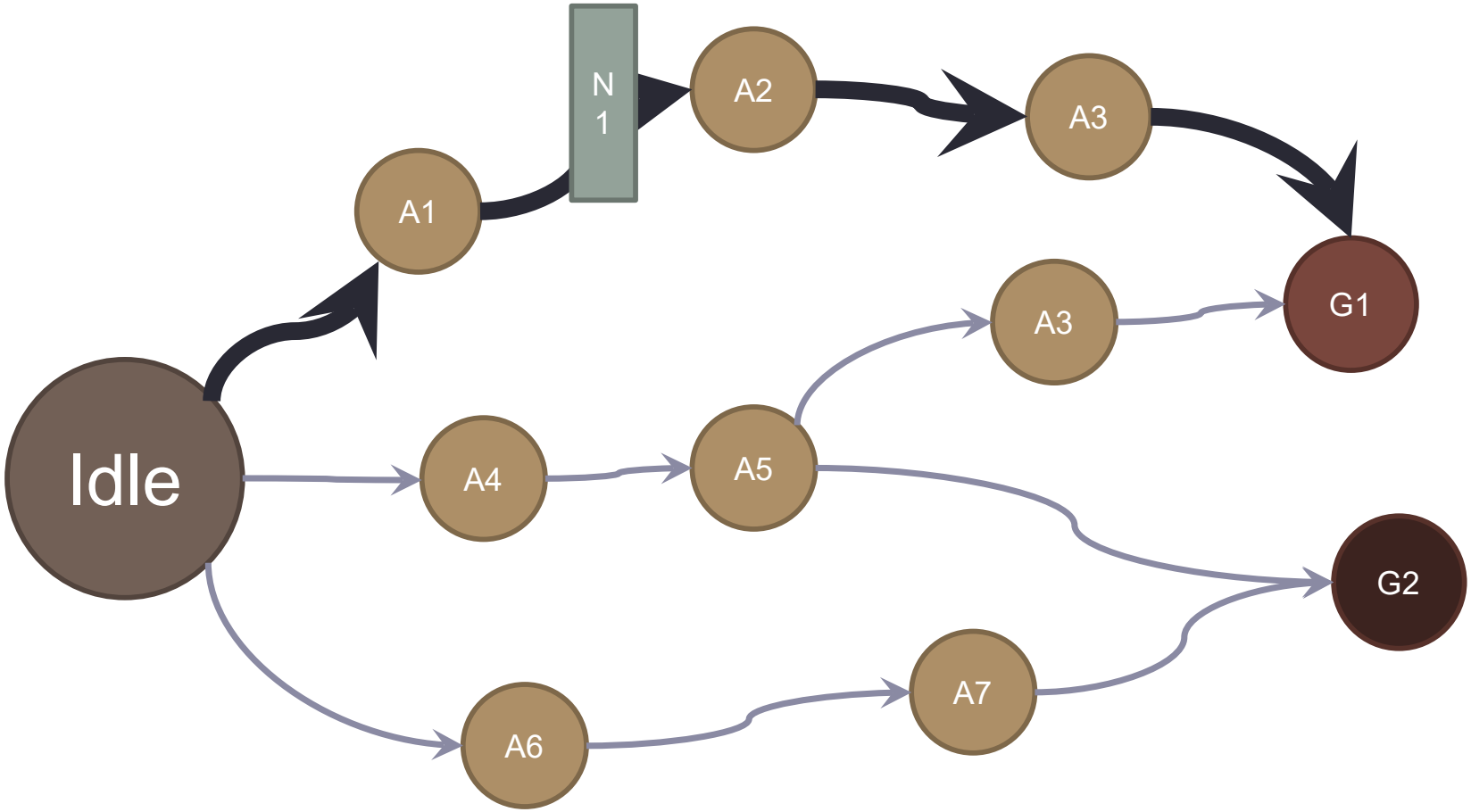
G1
G2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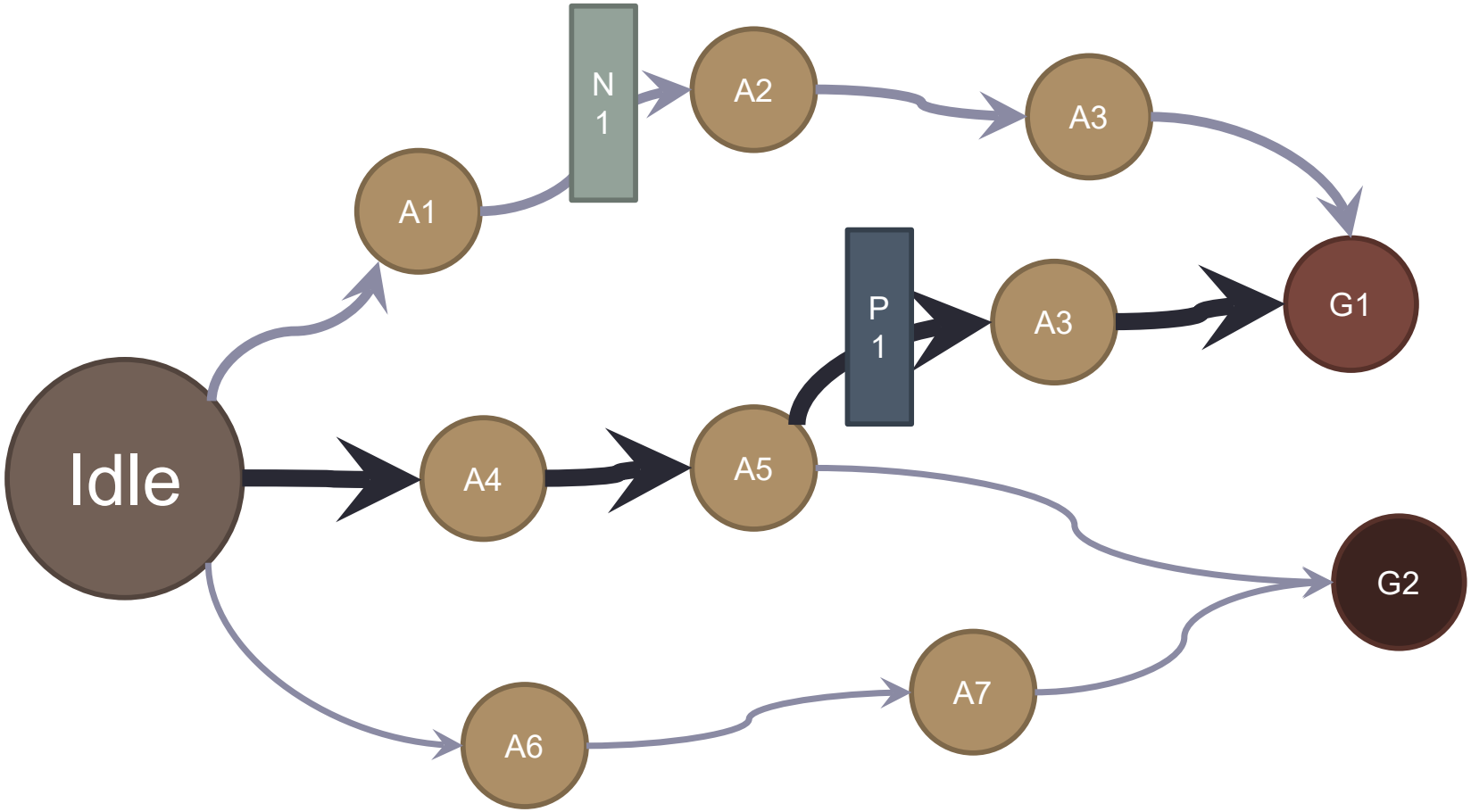
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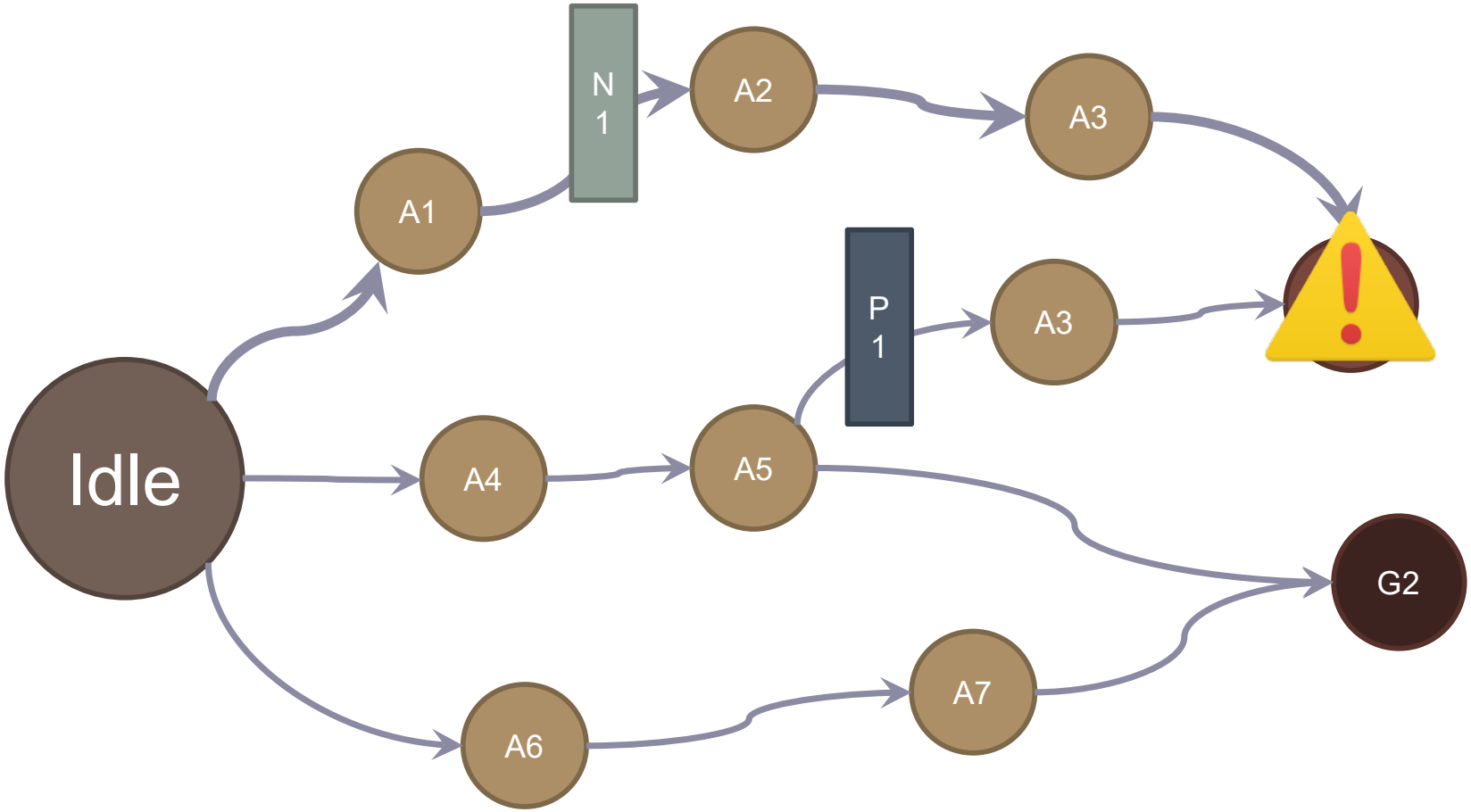
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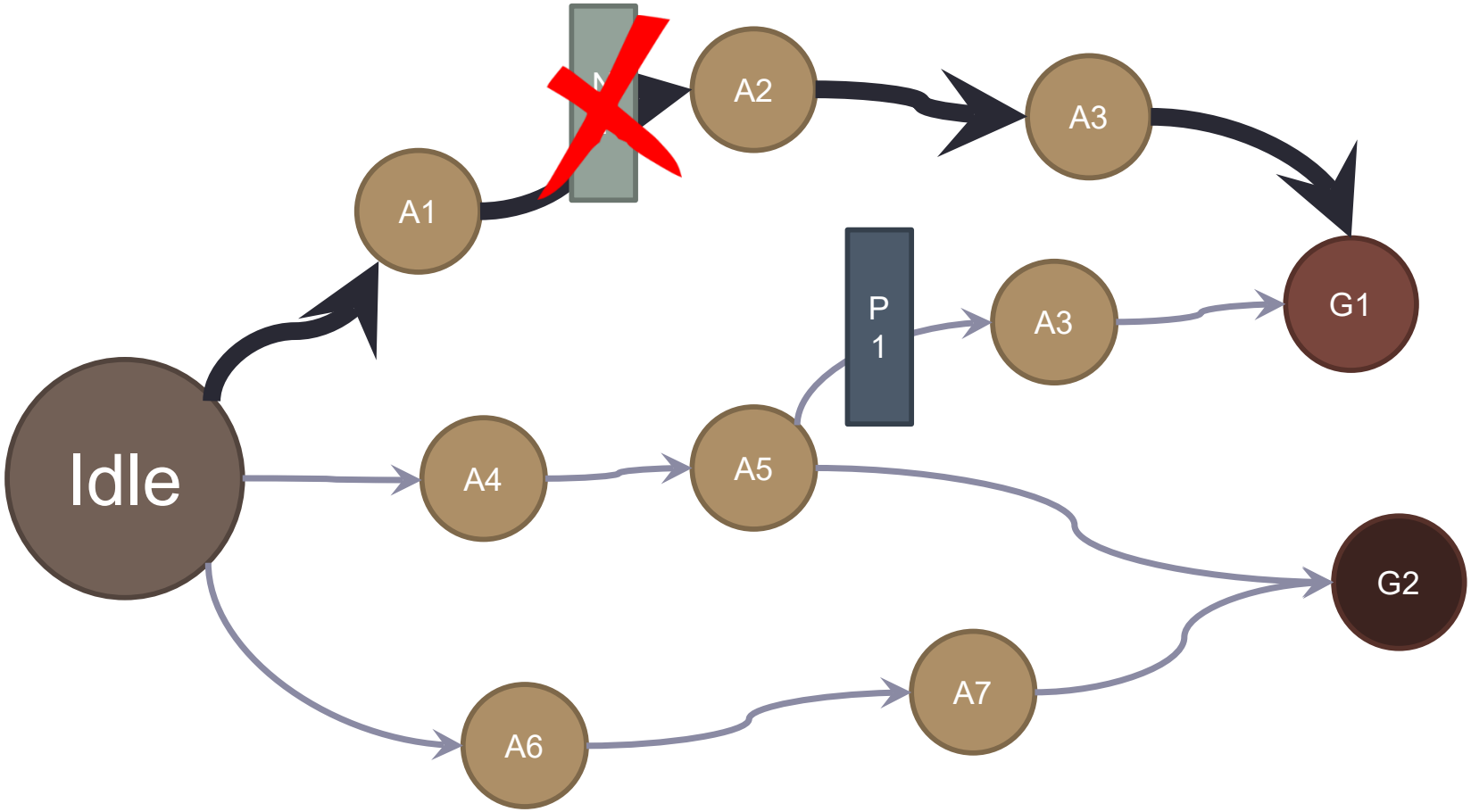
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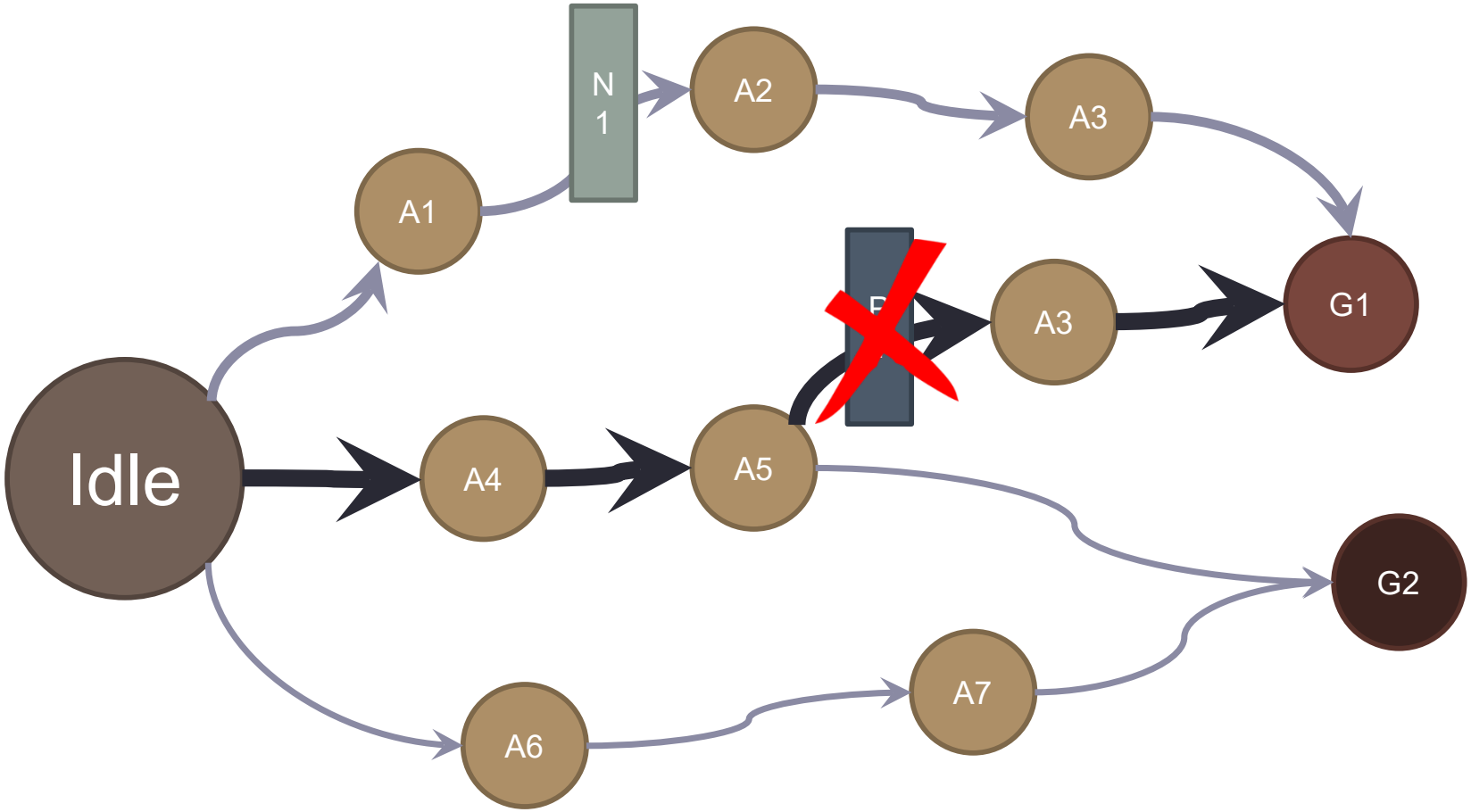
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A2
A3
A1
A3
G1
Idle
A4
A5
G2
A7
A6

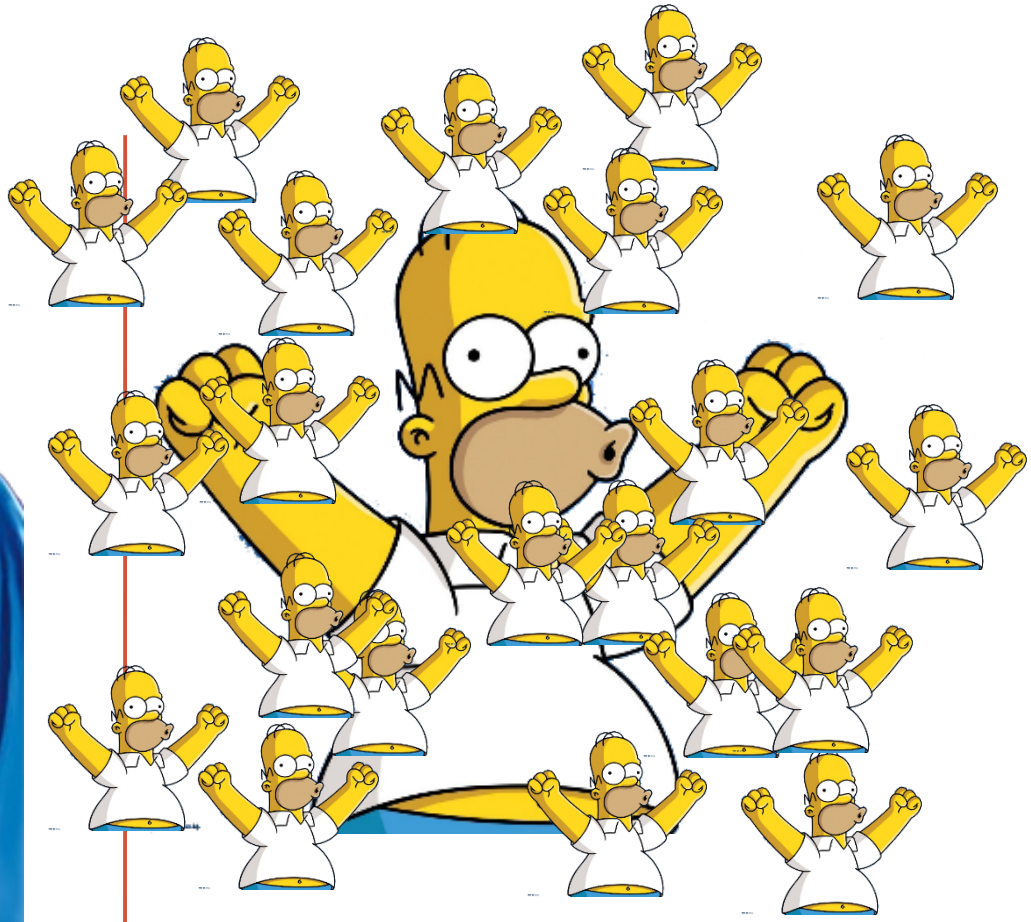
MAS vs. ABM

MAS

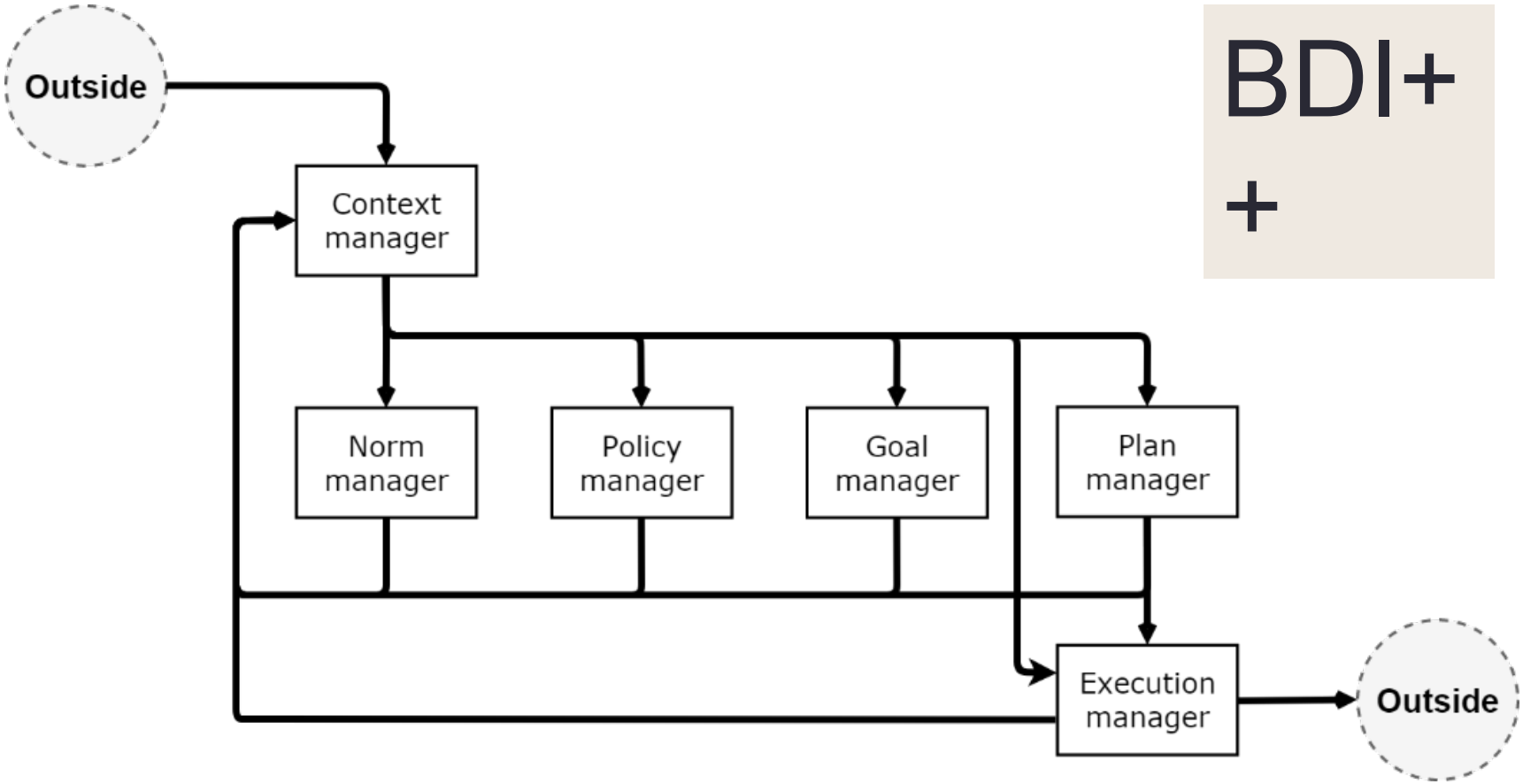
- Complex cognition
- Theoretically sound
- Computationally expensive
- Difficult to scale

ABM

- Relatively simple cognition
- Ad-hoc (not unjustified)
- Computationally inexpensive
- Easy to scale



BDI+
+


Outside
Context manager
Norm manager
Policy manager
Goal manager
Plan manager
Execution manager
Outside

Example (I)

- Goal

goal1 = {money > min_debt}

goal3 = {money = max_money}

- Norm

$$N_{fishing} = [G = \{money = current\_debt * repayment\_rate\},$$
$$C = \{boat = small\_boat\}]$$

Example (II)

- Policy

$$P_{fishing} = [Ca = \{(fishing\_action, \{remaining\_quota > 0)\},$$
$$Ce = \{(fishing\_action, remaining\_quota \text{ -= } fished\_quota)\},$$
$$G = \{money = quota\_depletion\_rate * initial\_quota * fish\_value\},$$
$$P = \{fishing\_action, \{remaining\_quota = 0\}]$$

Example (III)

- Action

fishing_action = [$\mathbf{C_{ph}}$ = {**boat** != null, **days_at_sea** > 0},
$\mathbf{E_{ph}}$ = {**money** = **days_at_sea** * **efficiency** * **catch_value**}]

- With norm

fishing_action = [$\mathbf{C_{ph}}$ = {**boat** != null, **days_at_sea** > 0},
G = {**money** = **current_debt** * **repayment_rate**}]

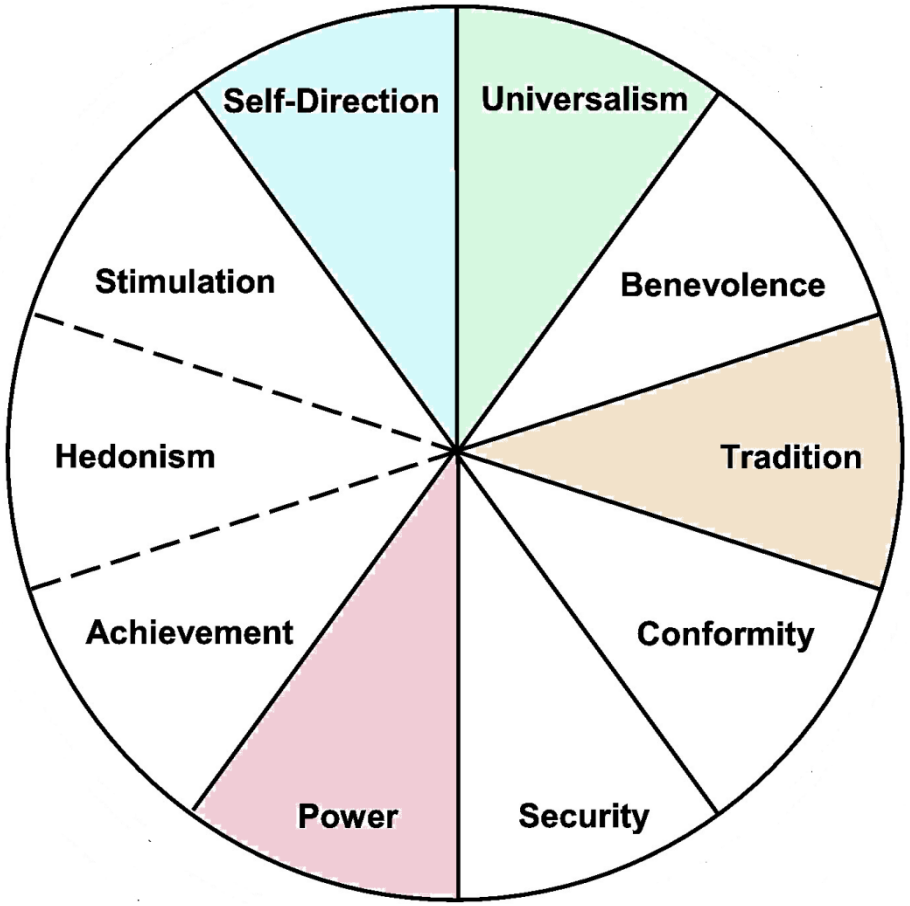
- With policy

fishing_action = [$\mathbf{C_{ph}}$ = {**boat** != null, **days_at_sea** > 0},
G = {**money** = **quota_depletion_rate** * **initial_quota** * **fish_value**},
$\mathbf{C_p}$ = {**remaining_quota** > 0},
$\mathbf{E_p}$ = {**remaining_quota** -= **fished_quota**}]

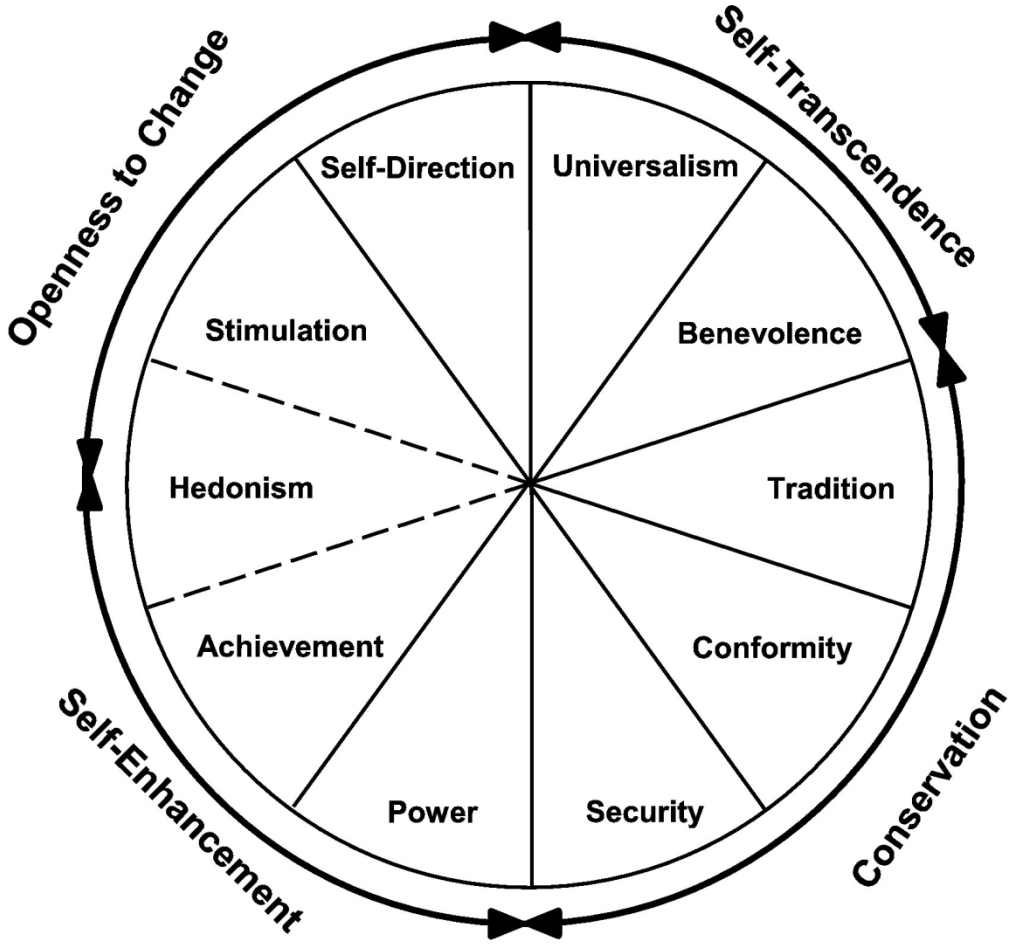
Norm deliberation

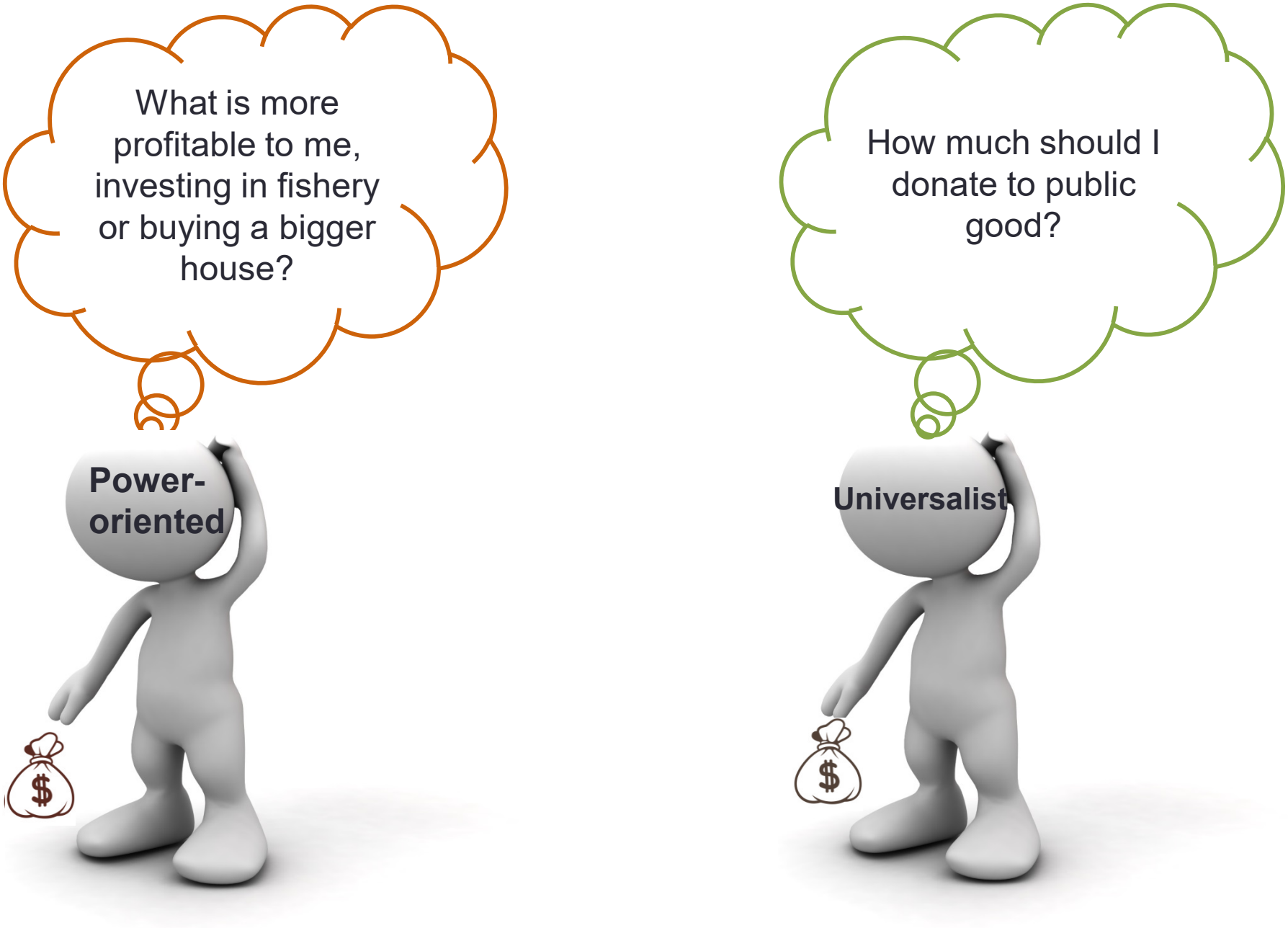
```
foreach(norm in Norms)
        if(norm.isActive)
                if(norm.isInternalized)comply with norm
                else foreach(goal in Goals)
                        checkCompatibility(norm, goal)
                        if (norm is compatible with goal)
                                comply with norm
                        else
                                costOfCompliance =
calculateCostOfCompliance
                                costOfNonCompliance =
calculateCostOfNonCompliance
                                if(costOfCompliance <=costOfNonCompliance)
                                        comply with norm
```

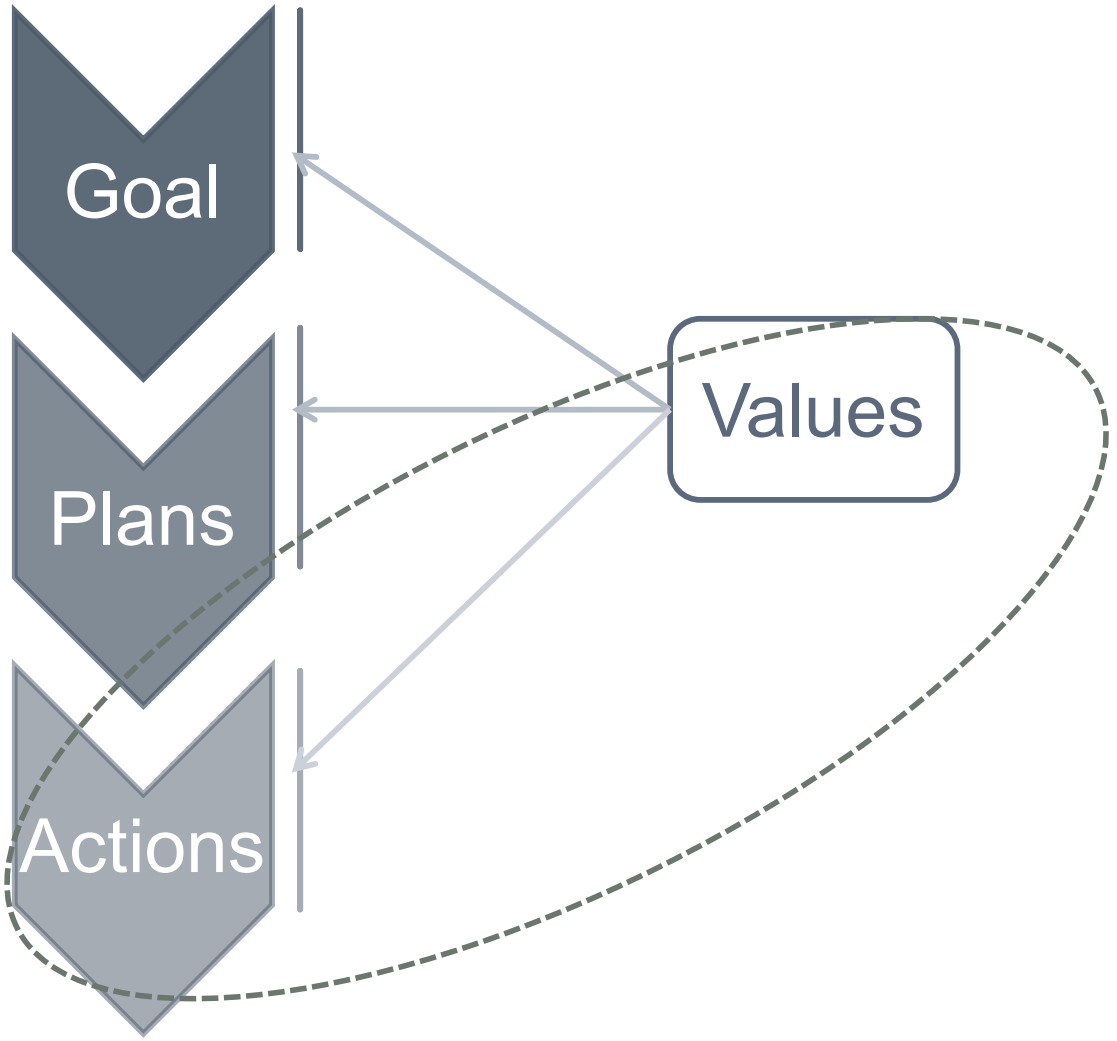
Values


Self-Direction
Universalism
Benevolence
Tradition
Conformity
Security
Power
Achievement
Hedonism
Stimulation

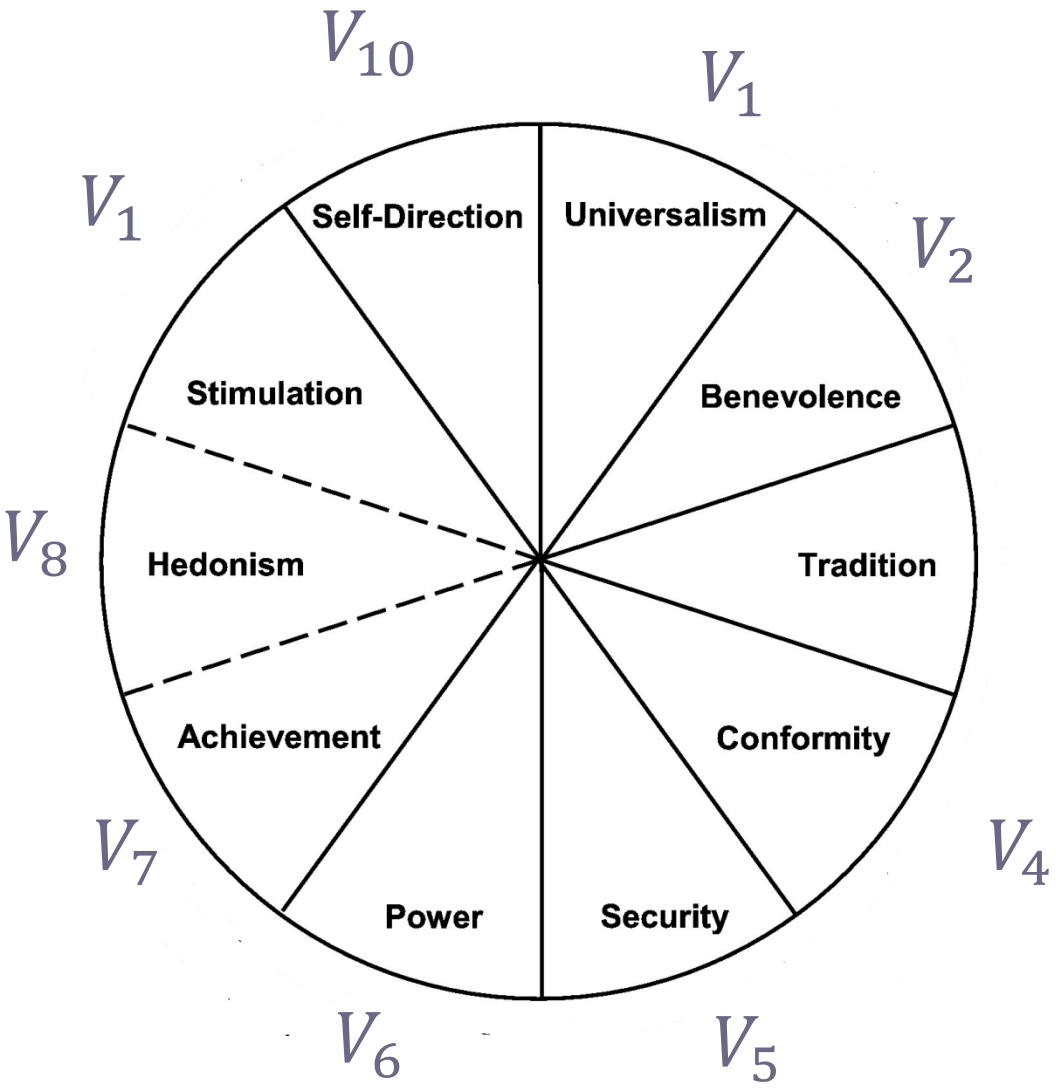
Schwartz value system




What is more profitable to me, investing in fishery or buying a bigger house?
Power-oriented
How much should I donate to public good?
Universalist


Goal
Plans
Actions
Values

Value framework implementation



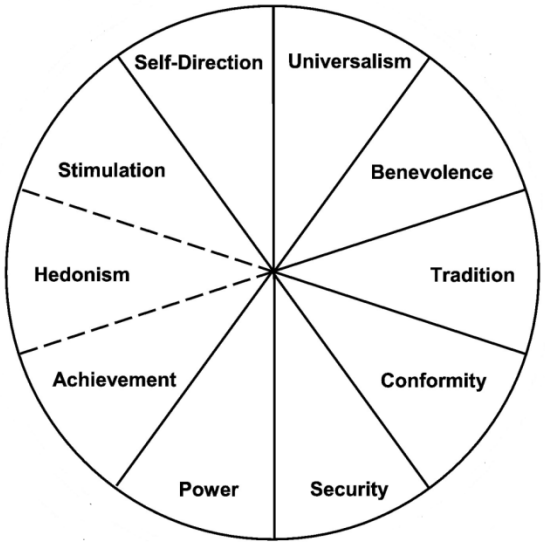
V_i= i^{th} value in the circle

$\tau(V_i)$ = importance of i^{th} value

Value framework

Condition 1: $\forall i, j \in 1..10 \ : \ 0 \leqslant |\tau(V_\mathrm{i}) - \tau(V_\mathrm{j})| \leqslant m_{i,j}, where:$

$$m_{i,j} = \begin{cases} |i-j| * c & \text{if } |i-j| \leqslant 5 \\ (10 - |i-j|) * c & \text{if } |i-j| > 5 \end{cases}$$

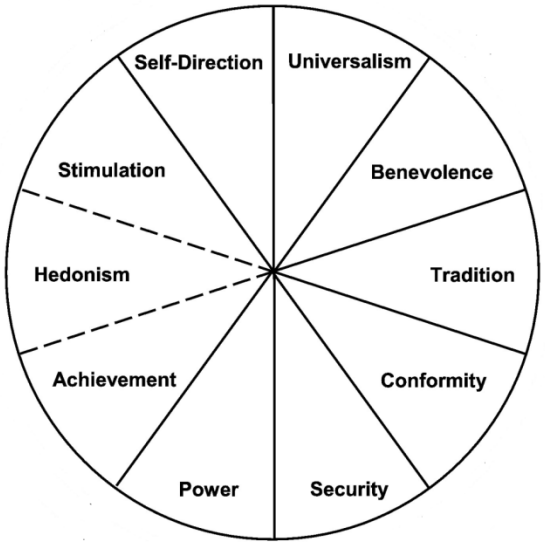


Value framework

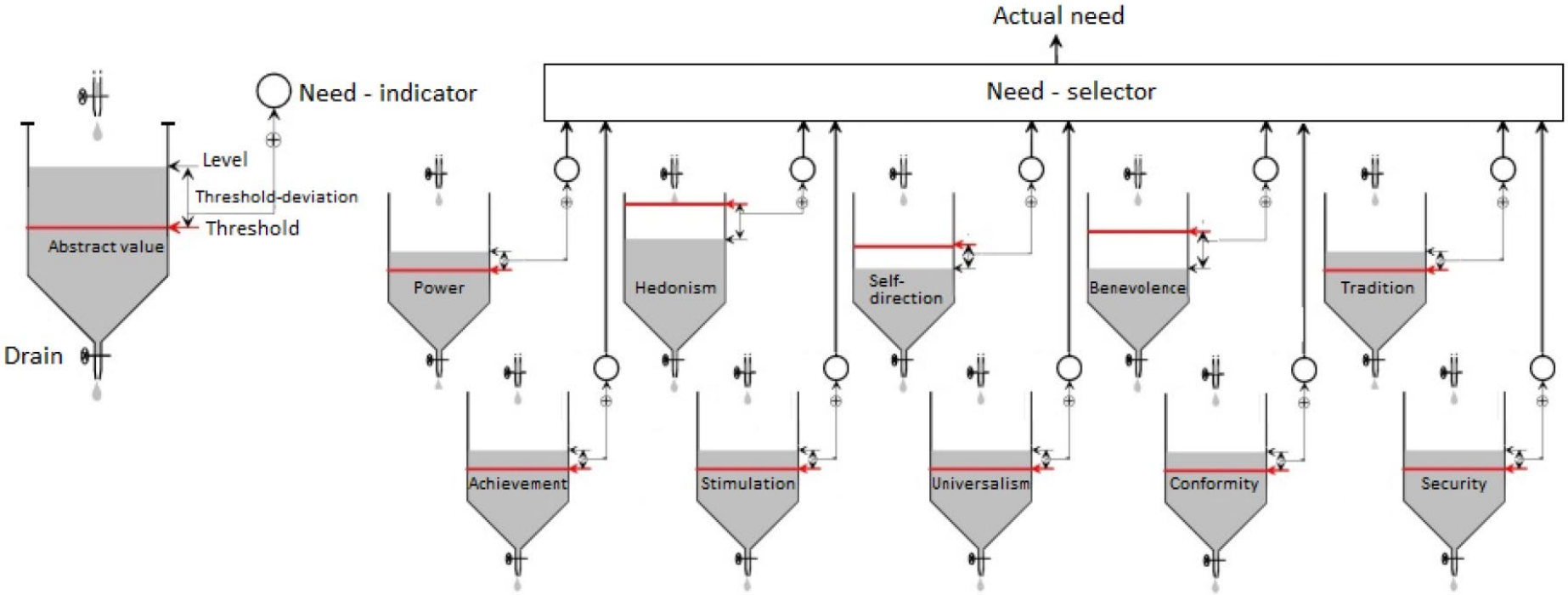
Condition 2:

$$\begin{cases} \tau(V_i) > 50 & \text{if } \tau(V_j) = 0 \\ 100 - \frac{c}{2} \leqslant \tau(V_i) + \tau(V_j) \leqslant 100 + \frac{c}{2} & \text{if } \tau(V_j) \neq 0 \ \& \ \tau(V_i) \neq 0 \end{cases}$$

where $j = (5 + i)\%10$.



Water tank model



λ_i = fluid level V_i, how much the value is satisfied

ρ_i = threshold, when a value gets salient

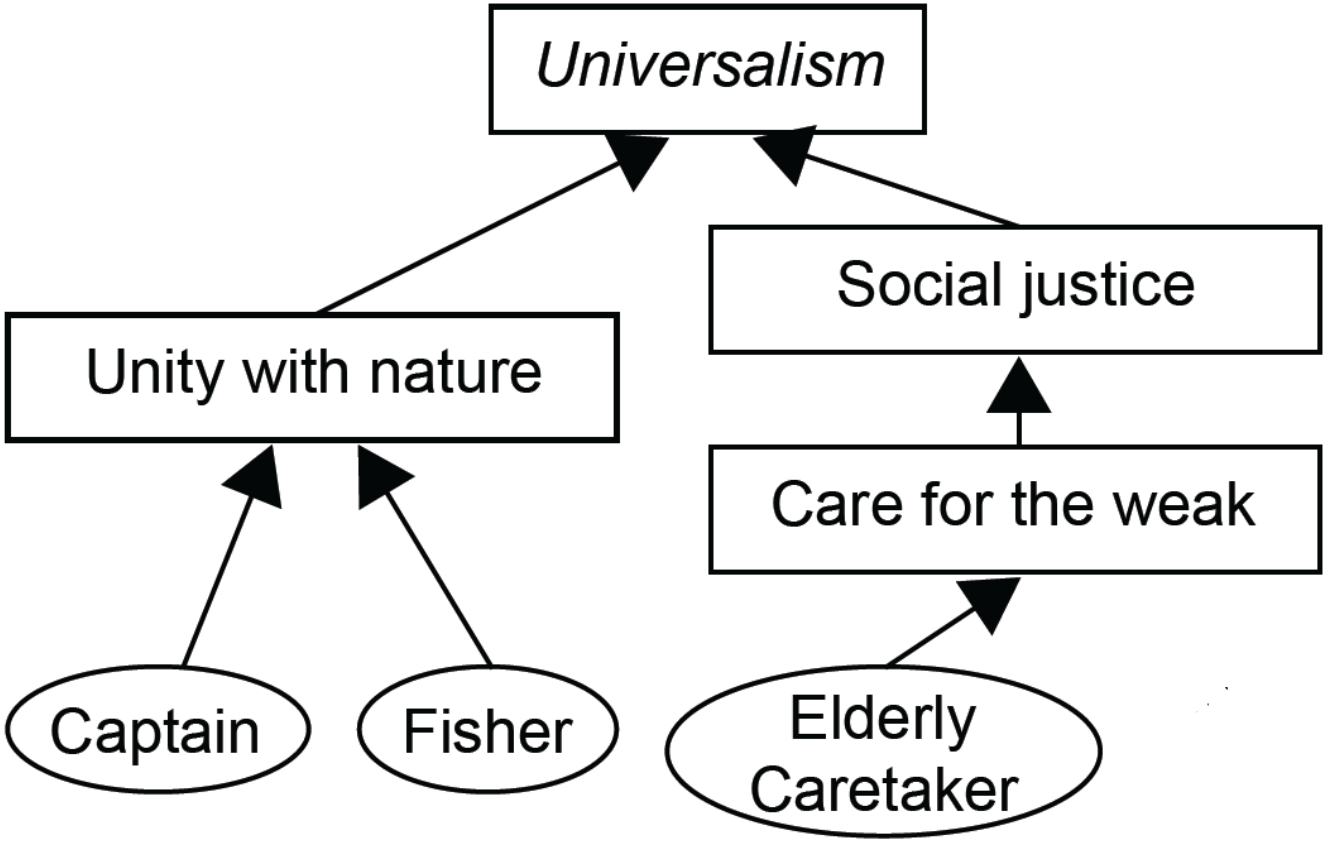
Value based selection

$$\rho = -((\lambda - \tau(V_i))/\tau(V_i)) * 100$$

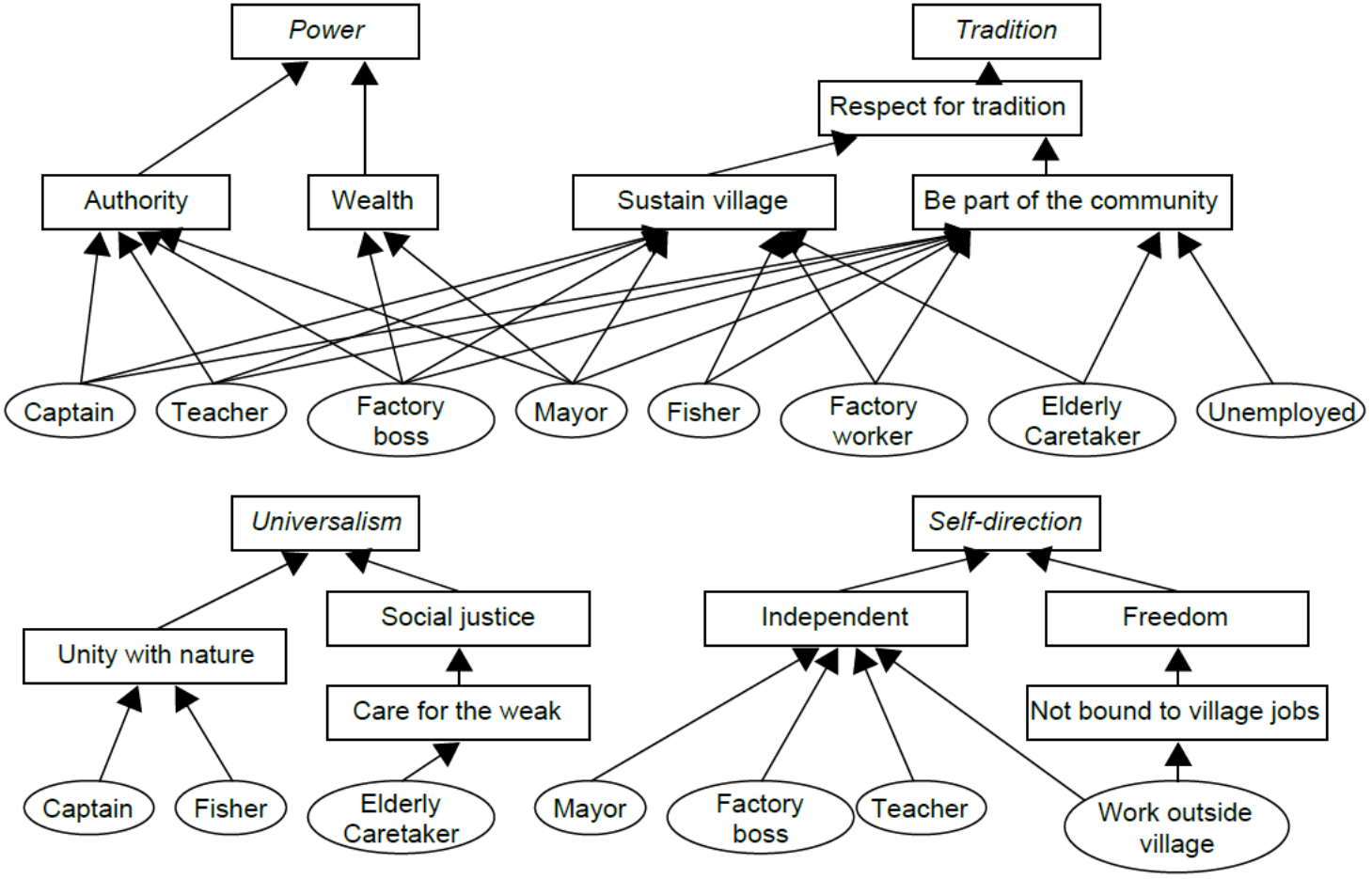
$$\underset{V_i \in Values}{\arg\min}\ \rho(V_i) = \{V_i | V_i \in Values, \forall V_j \in Values : \rho(V_j) > \rho(V_i)\}$$

Connecting values to actions

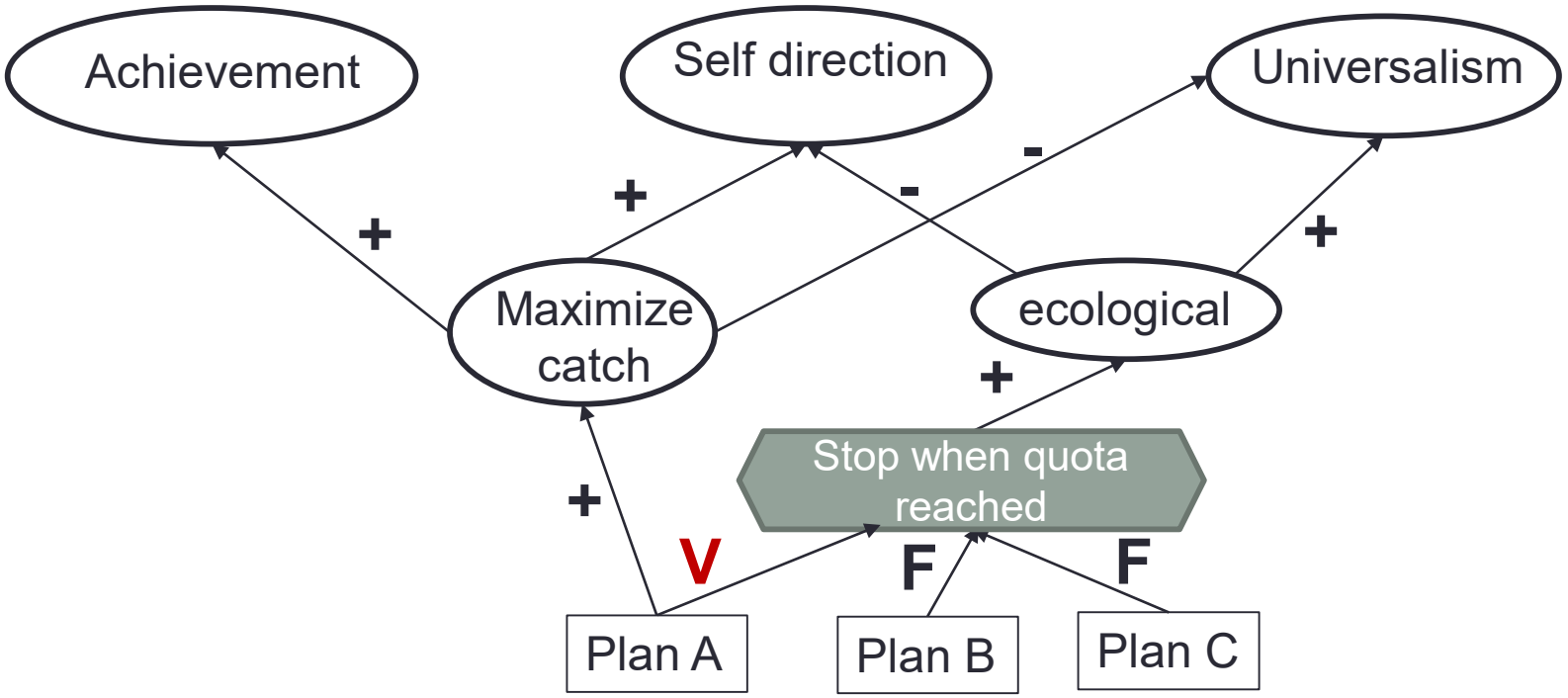
- Value trees



Job selection-value trees



Values and Norms

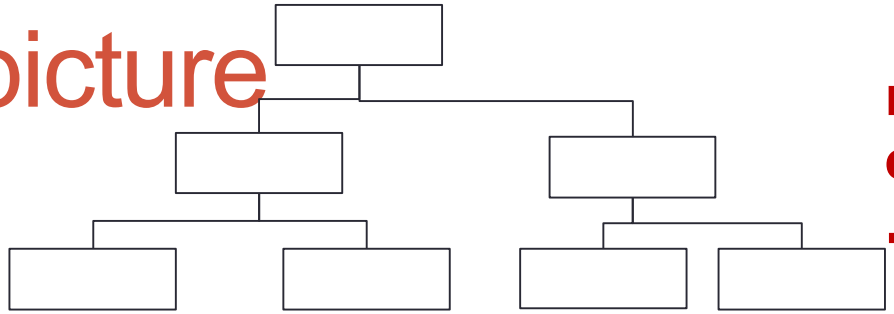


Conclusions

- Incorporate values through a value tree
- Changing definitions and interpretations of values leads to different outcomes of a simulation
- Norms can be used to shortcut reasoning about values
- Full normative reasoning about norms and values is not scalable for social simulations
- Simple but explicit incorporation of both concepts IN the simulation gives interesting results

- New simulation platforms needed in order to make user interaction on values, norms, etc possible

The BIG picture



norms
organizations
…

Social practices

CONTEXT

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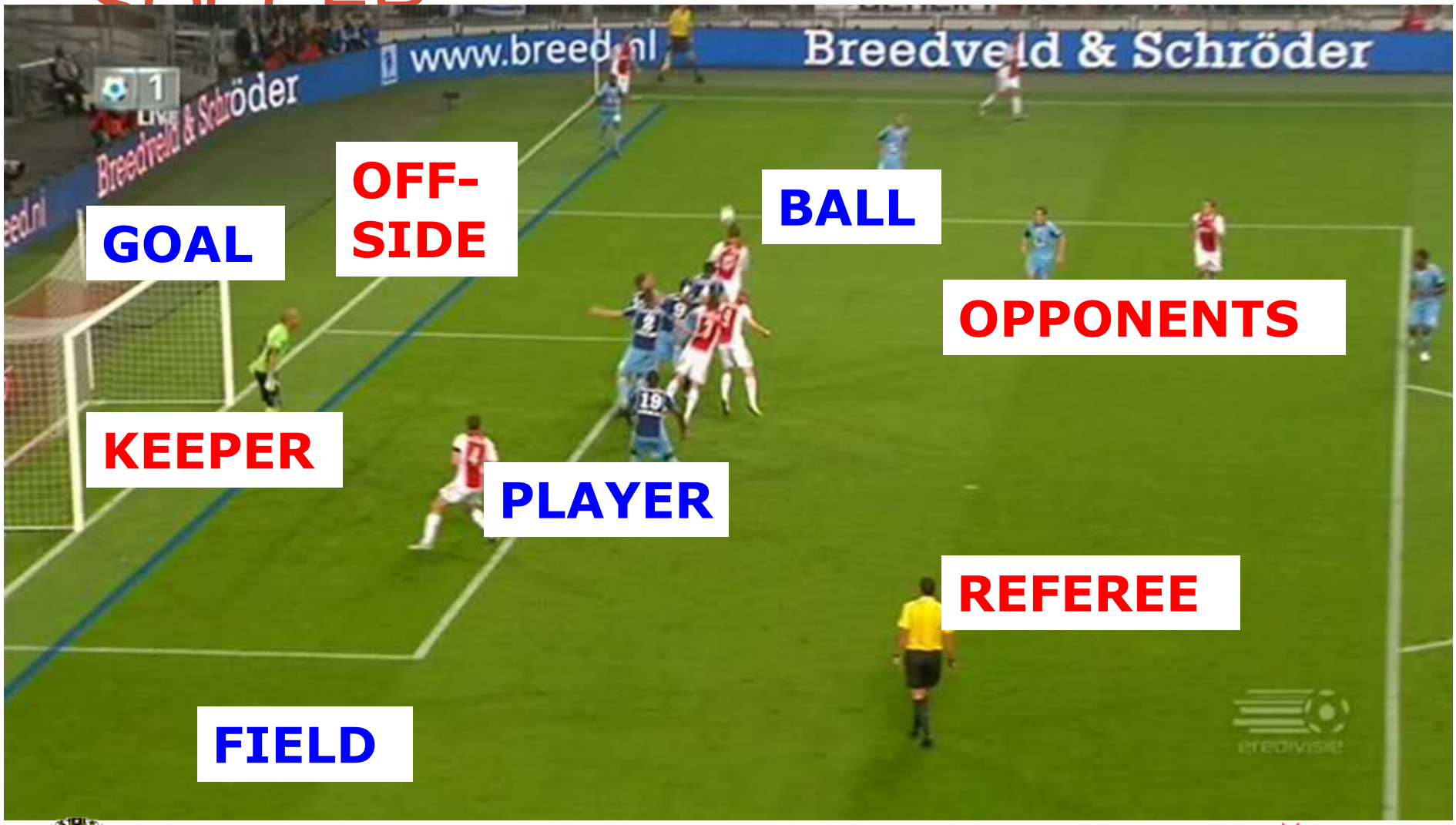
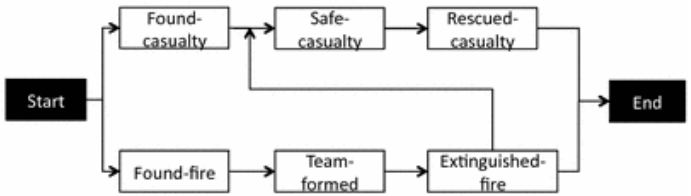
Motivation: CONTEXT recognition

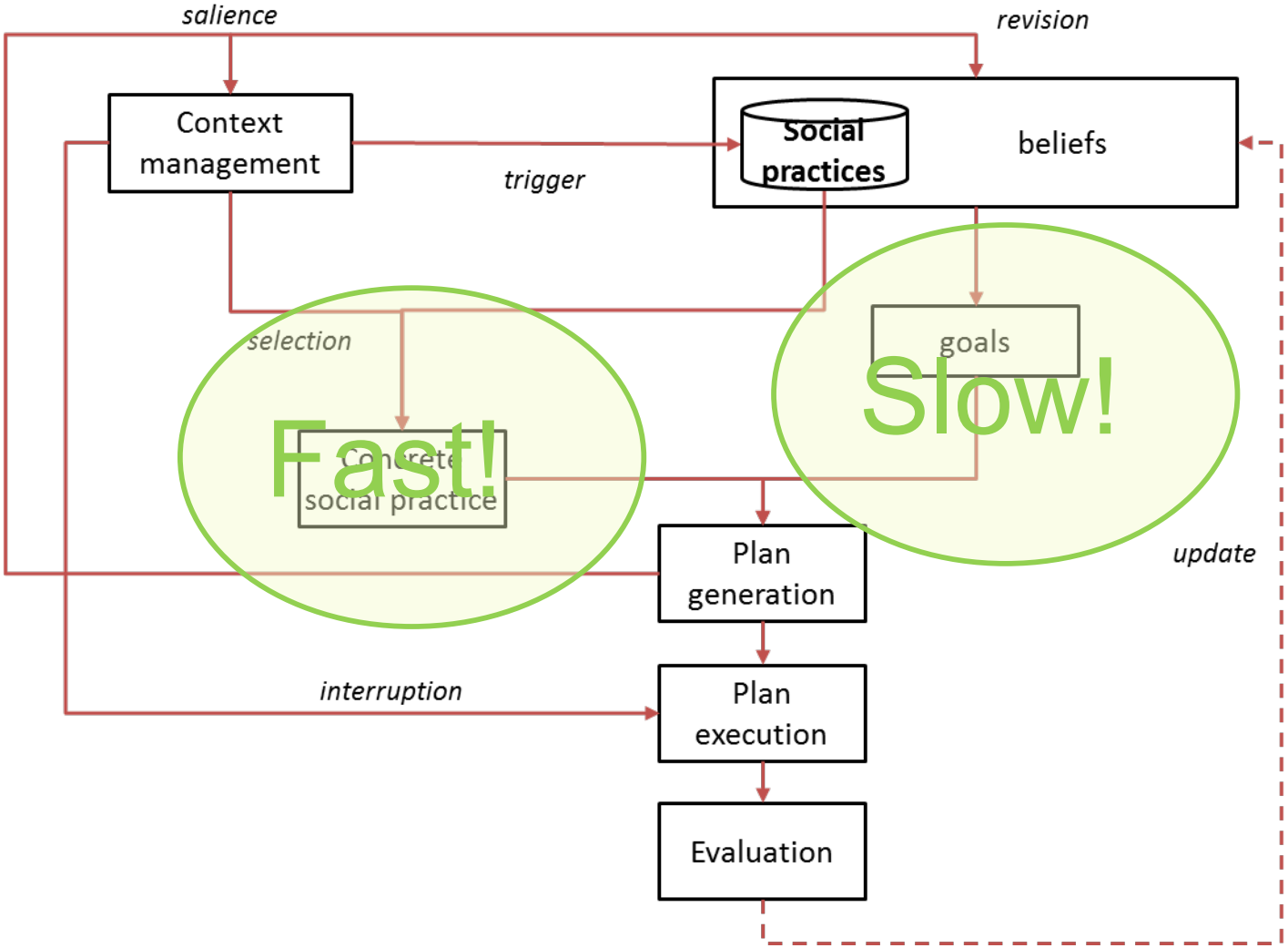
Social Practices

- Materials:
  - Physical elements that are part of a practice
- Meaning:
  - Understandings, beliefs, emotions, social interpretations that are part of a practice
- Competence:
  - Skills and knowledge needed for a practice

SOCCER



Abstract Social Practice	Combat Fire	Going to work
Physical Context		
Resources	inflammable objects, water, barriers…	Vehicles, money, …
Places	locations of fire, actors and resources,…	Stations, roads,…
Actors	Victims, bystanders, colleagues,…	Drivers, co-passengers, …
Social Context		
Social interpretation	Dangerous places, safe places, rescue equipment	Bus driver, train driver…
Roles	police, medics, …	
Norms	own safety; public safety	
Activities	Identify type of fire; Extinguish fire; Removal victims; Clear area; ensure own/team safety; …	Choose transport type; buy ticket; drive car; …
Plan patterns		
Meaning	braveness, leadership, …	Environmental conscientiousness, comfort, social status, …
Competences	• Fire combat knowledge and skills • Coordination skills	• driving skills, • cycling skills, • knowledge of public transport routes


salience
revision
Context management
trigger
Social practices
beliefs
selection
goals
Slow!
Fast!
Concrete social practice
Plan generation
update
interruption
Plan execution
Evaluation

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