Cognition as management of meaningful information. Proposal for an evolutionary approach.

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A) Cognition for Agents Coping with their Environments (Animals, Humans, Robots).

B) Agents have Constraints to Satisfy.

C) Animals with "stay alive" Constraint. Starting point for an Evolutionary Approach.

D) Constraint Satisfaction by Generation of Meaningful Information. MGS Model.

E) MGS: Building Block for Agents and for Evolutionary Approach.

F) Evolutionary Approach to Cognition by Evolution of Meaning Generation.

G) Cognition as Management of Meanings. Evolution of Cognition.

H) Continuations

Cognition as management of meaningful information. Proposal for an evolutionary approach.

A) <u>Cognition for Agents coping with their Environments</u>

*** Cognition as a coordinated set of tools evolved for coping with environment.**
*** Cognition exists for agents. Cognition does not exist per se.**
*** Agents: Animals, Humans, Robots.**

B) <u>Cognition for Agents that have Constraints to Satisfy</u>

*** Agents cope with environment by constraints satisfaction.**
*** Animal: stay alive, reproduce, maintain group life, manage hierarchy, …**
*** Human: be happy, efficient, rich, smart, add value, valorize ego, …**
*** Robot: avoid obstacles, find best path, … (as designed).**

C) <u>Animal with "stay alive" Constraint. Starting point for an Evolutionary Approach</u>

*** Animals sense their environment. Connection with "stay alive" constraint.**
*** => Meaningful information: presence of danger incompatible with staying alive.**
*** => Action implementation: get away from danger.**

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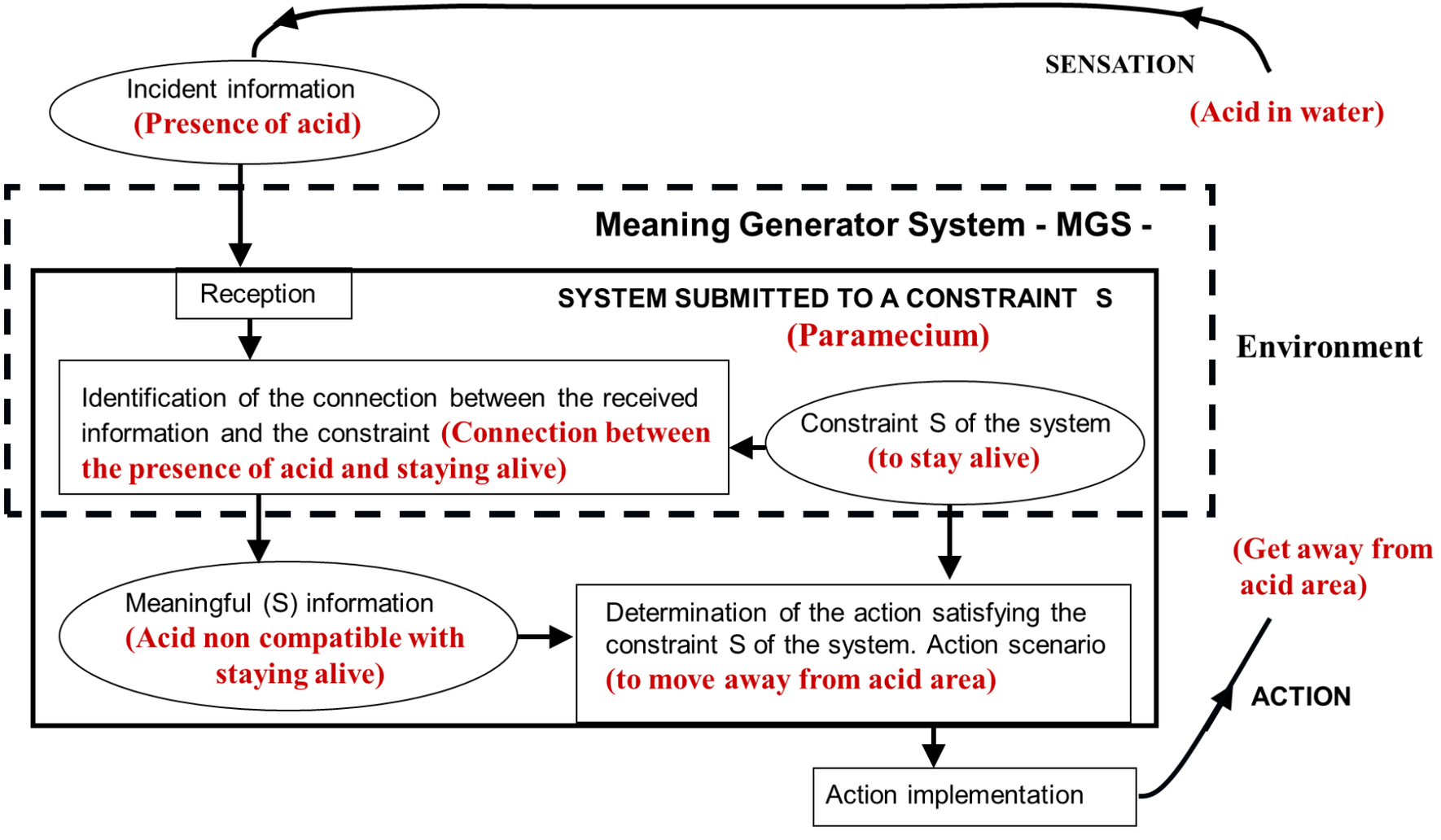
D) Constraint Satisfaction by Generation of Meaningful information. MGS [1, 2]

*** Definition of "Meaning": connection between received information and constraint.**

- Concepts of "truth" or "autonomy" not needed at MGS level.



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E) <u>MGS: Building Block for Agents and for Evolutionary Approach</u> [2, 4]

*** Meaningful (S) Information. MGS grounds meaning in sensorimotor process.**

*** Meaningful information generation , transmission, storage., … IP.**

*** MGS for meaningful representations in agents (networks of meanings).**

*** Meaning generation embeds agents in their environments.**

F) <u>Evolutionary Approach to Cognition by Evolution of Meaning Generation</u> [4]

*** Evolution of agents:**

- Animal, human, robots (products of humans).

*** Evolution of constraints /meanings from Animals to Humans. Evolution of cognition:**

- Problem of unknown nature of human mind. Human constraints difficult to define (free will).
- Maslow pyramid needs / Freudian drives.
- Anxiety limitation processes from evolutionary approach to self-consciousness (next page). Links language to self-consciousness [5].

*** Derived constraints for Robots.**

- Robot as agent with derived constraints/meanings/intentionality.

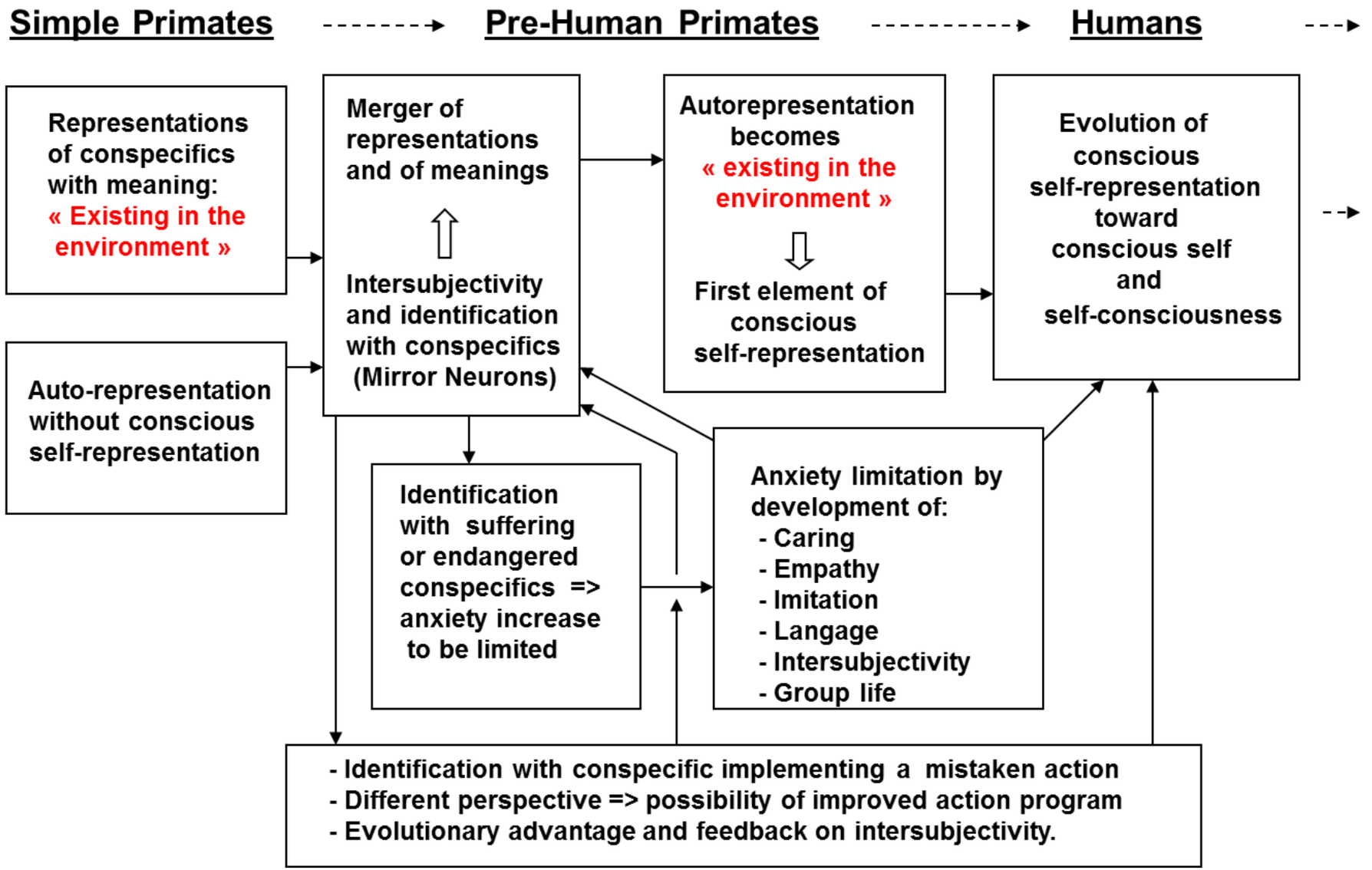
*** Proposal for evolutionary approach to cognition. From animal to humans & robots:**

- Evolution of agents, constraints and meaning generation => evolution of cognition.

Cognition as management of meaningful information. Proposal for an evolutionary approach

* Evolution of constraints from Animals to Humans [4]:

- Anxiety limitation processes from evolution of auto-representation-



Cognition as management of meaningful information. Proposal for an evolutionary approach.

G) Conclusion: Cognition as Management of Meanings. Evolution of Cognition

Cognition

* For agents submitted to constraints. Does not exist per se
* Management of meanings
* Embed agents in their environments

Agent	Constraints	Agent's characteristics
Animal	* Stay alive - Metabolic - Individual - Group life - Species	* Alive * Autonomous * Bio-intentional * Generates meaning - Organic self -
Human	* Maslow pyramid needs * Freudian drives * Limit anxiety * Look for happiness	* Self Conscious * Capable of free will - Self Conscious Self -
Robot	Designer's choice	* Derived intentionality * Artificial autonomy & consciousness - Artificial Self -

Cognition as Management of Meanings

Evolution of Cognition as Evolution of Meanings

Cognition as management of meaningful information. Proposal for an evolutionary approach.

H) Continuation

* Formalize “constraints“ relatively to the nature of agents (animal, humans, robots).
* Address nature of life, consciousness, bio and robots intentionality [3, 6, 7].
* Look at a possible evolutionary approach to the notion of self [8].

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