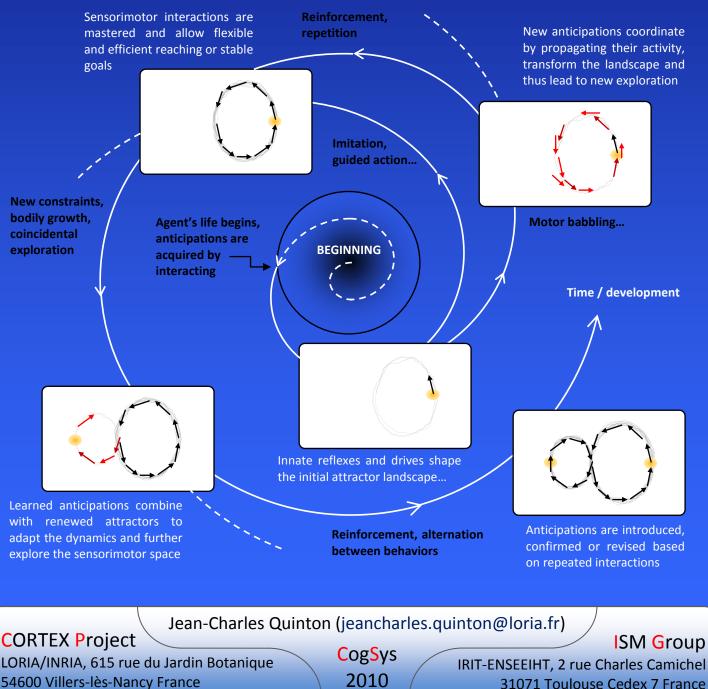# Sensorimotor Exploration/Exploitation
with coordinating local predictions

Framework & Principles

This contribution aims to show how **exploration and exploitation** might be **tightly intertwined** when modeling sensorimotor behaviors with coordinated predictive local representations. In such a framework, **learning** equals to **creating and selecting anticipations** to adapt to the dynamics of the agent and its environment. Motor actions are undertaken based on the expected outcome of the anticipations, and anticipations reinforced when successfully matching the dynamics. Reaching goals is thus equivalent to **navigating through the sensorimotor space** by forming and following **chains of coordinated predictions**. Although the agent may constantly only try to exploit its knowledge, the presence of multiple dynamic goals, the lack of correct anticipations, interactional noise or external constraint will lead to further exploration and the generation of new task-independent representations.

Sensorimotor interactions are mastered and allow flexible and efficient reaching or stable goals

Reinforcement, repetition

New anticipations coordinate by propagating their activity, transform the landscape and thus lead to new exploration

Motor babbling…

Imitation, guided action…

New constraints, bodily growth, coincidental exploration

Agent's life begins, anticipations are acquired by interacting

BEGINNING

Time / development

Learned anticipations combine with renewed attractors to adapt the dynamics and further explore the sensorimotor space

Innate reflexes and drives shape the initial attractor landscape…

Reinforcement, alternation between behaviors

Anticipations are introduced, confirmed or revised based on repeated interactions

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