# Imagination and thermoregulation

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INTRODUCTION :

Thermodynamic noise is usually used to allow the generalization of knowledge within system of networks of neurons (1). We propose here a macroscopic model of neuronal organization integrating the role of the thermodynamic noise in the genesis of the innovation from what exists (imagination).


Generalization
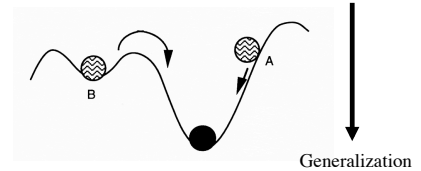
MODELIZATION :

This model is mainly made up of two networks (2). A first ensuring the transformation of "the space of perceived" towards an internal representation of the world (Pnetwork). The second providing the function reverses first i.e. ensuring the transformation of the representation of the world towards a "space of known" (Knetwork).
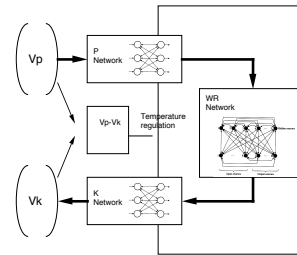

It is to be recalled that the neuronal activity in the model of Mac Culloch and Pitts can be described like resulting from the integration of the afférences applied to a function of threshold and a statistical termodynamic component depend on the temperature (Q10) (3).
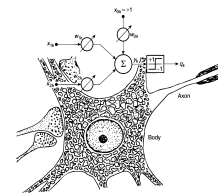
Thermodynamic probability of neuron discharge defined by :

$$P_k = \frac{1}{1 + \exp(-\frac{\Delta E_k}{T})}$$

In our model we propose the existence of a loop which starting from the measurement of the distance between perceived and known control the temperature of the system. In a shematic way perceived can be represented by the Vp vector, known by the Vk vector. The Vp-Vk distance playing the part of parameter of control of the temperature of the system and thus of the capacity of the system to create innovation.
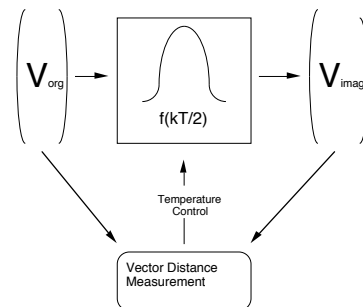
PERSPECTIVE :

The validity of this model is now to be checked experimentally by imagination tests like Vandenberg-Kuse mental rotation (1) , Social Cognition and Object Relations Scale Q-Sort (2) or Imaging Ability Questionnaire (3) with control of central temperature of the subject by pharmacological agent known to increase or to decrease the temperature of the subject.

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