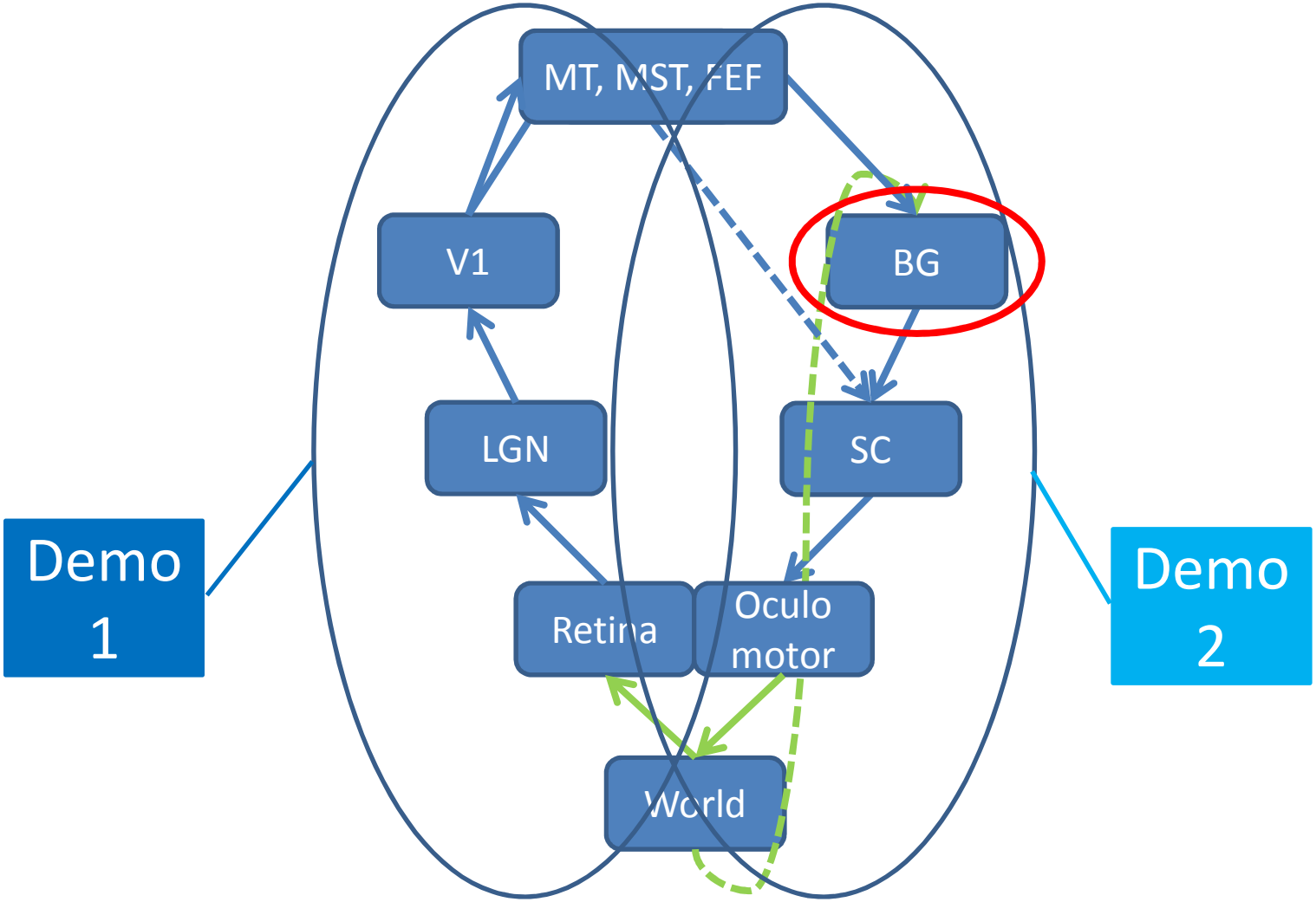
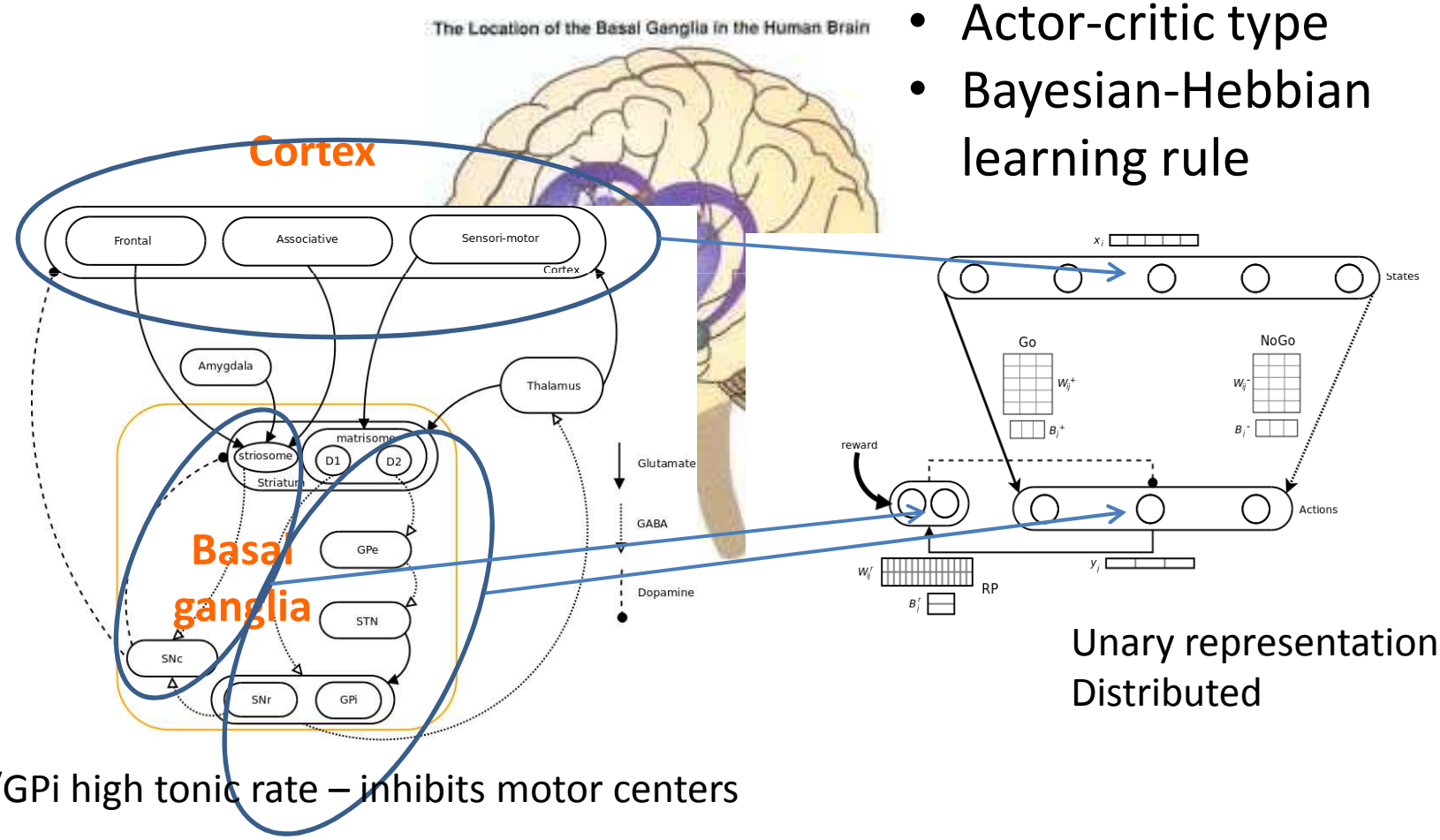
Visual Demo 1 & 2 - Overall view



Biology and Model of Basal ganglia

- Abstract model
  - Actor-critic type
  - Bayesian-Hebbian learning rule

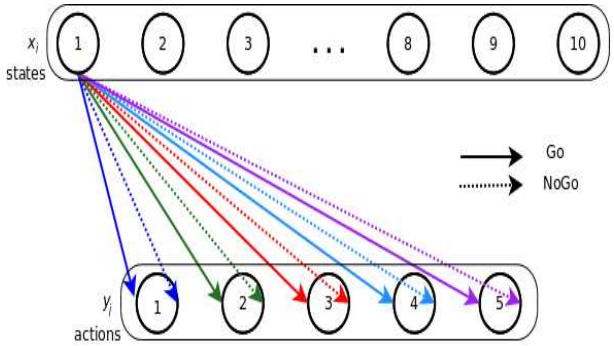


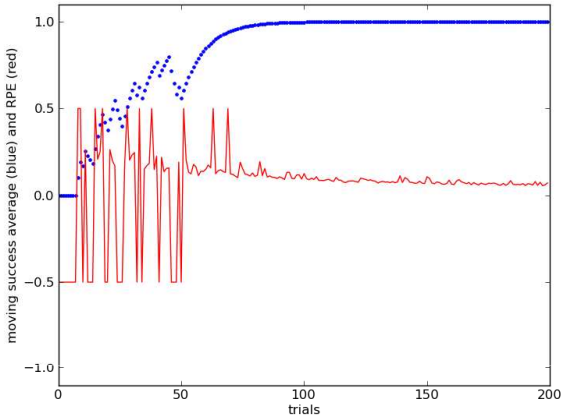
Unary representation → Distributed

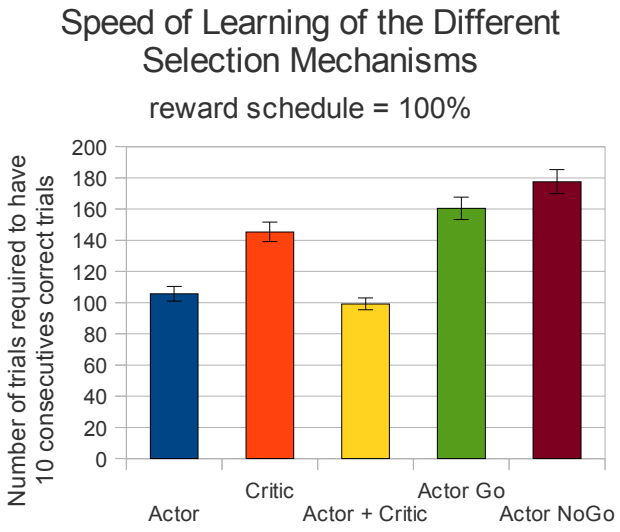
SNr/GPi high tonic rate – inhibits motor centers

Simple S-R learning

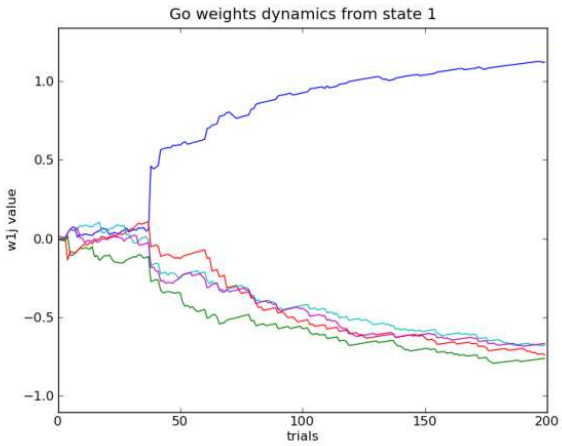
- Example
  - 10 states
  - 5 actions
  - 25 & 5, ...

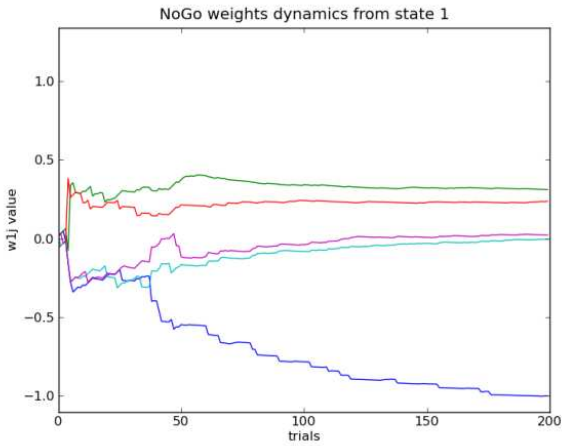






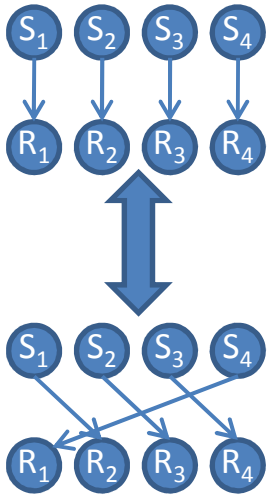
N:o trials needed



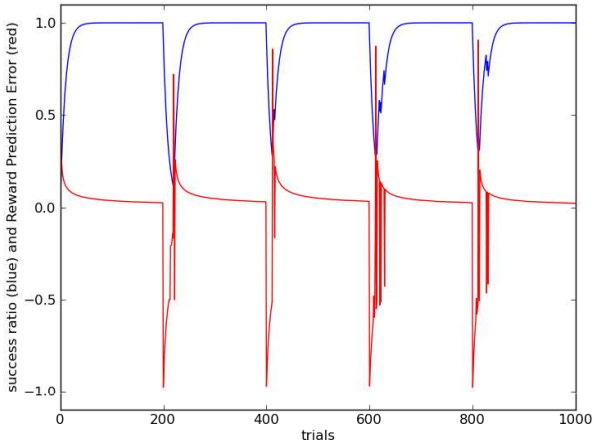


Reversal learning

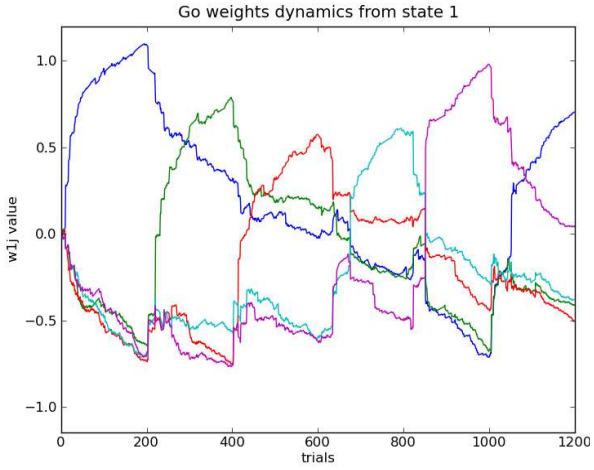
- Dynamics of the Reward Prediction Error (red) and the Success ratio (blue).

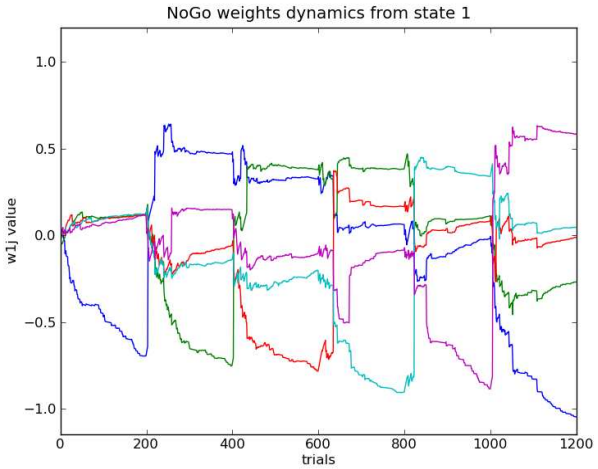


Performance , RPE

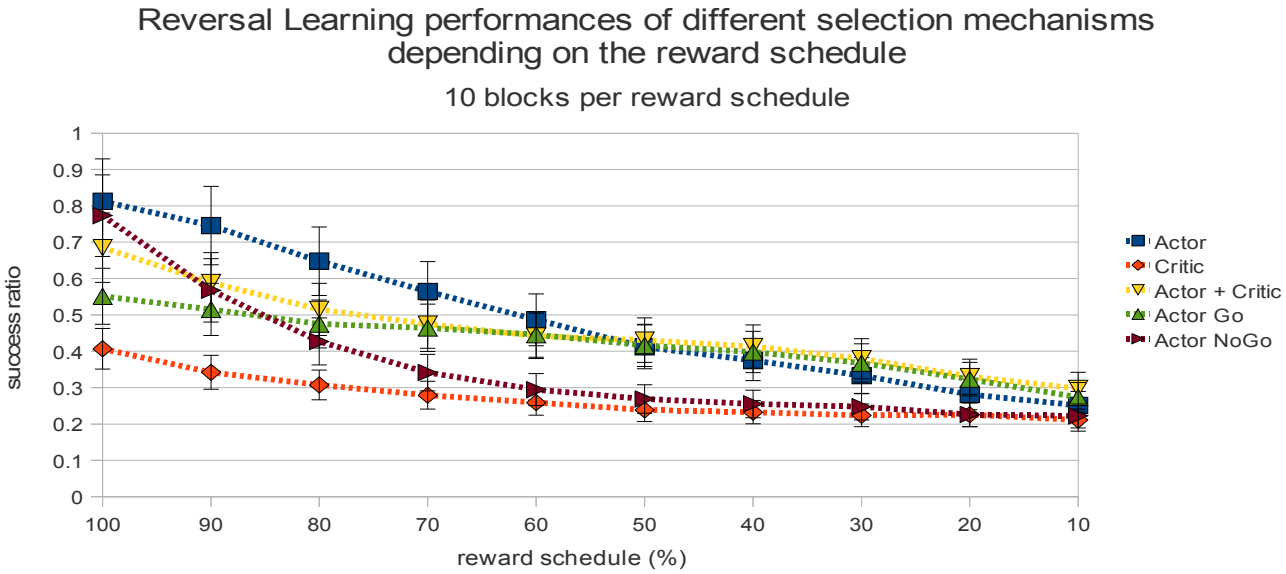


- Dynamics of weights in the Go and NoGo projection.





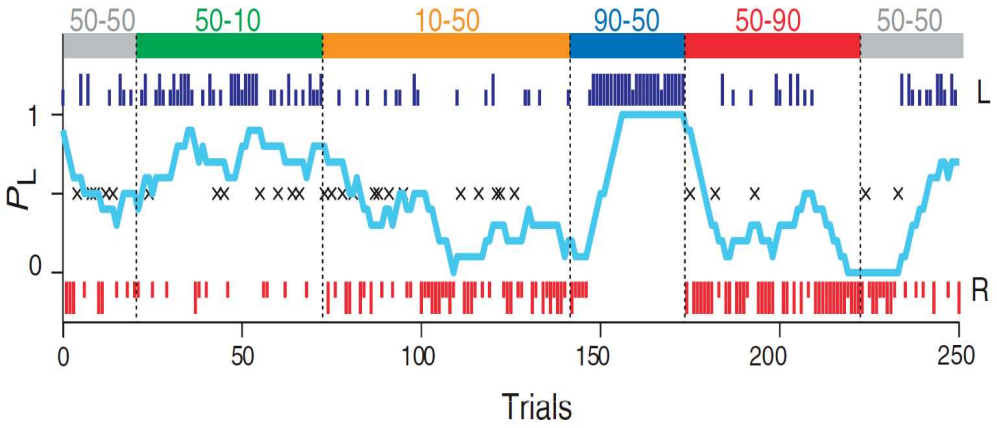
Stochastic reward

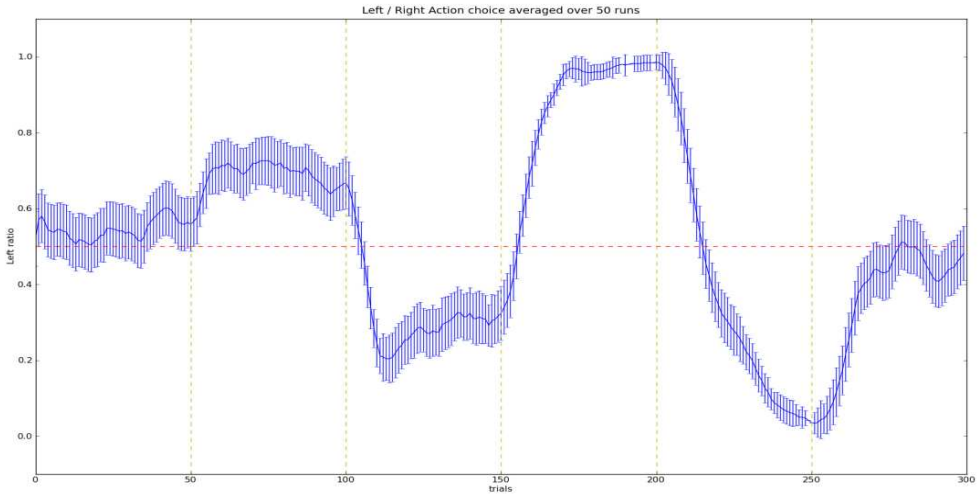


- Performance of different action selection mechanisms in a stochastic reward task (Reward probability on abscissa). Random choice gives a success ratio of 0.2. The standard one (“Actor”) performs best. Disabling/Lesioning the Go or NoGo patways have different effects.

Action selection dynamic in a choice task with changing reward schedules

- Upper: Results from experimental study on a monkey (Samejima et al., 2005)
- Lower: Results from model. Average of 50 simulations, error bars represent standard deviation.





Plans for Year 2

- Spiking model
  - AdExp
  - STDP/BCPNN
- Modular cortex - hypercolumns
  - Distributed representation