

ORAL PRESENTATION

Open Access

Stretching of memory in strategic decision making

Alberto Bernacchia*, Xiao-Jing Wang

From Twenty First Annual Computational Neuroscience Meeting: CNS*2012
Decatur, GA, USA. 21-26 July 2012

In mixed strategy games, players make unpredictable decisions to avoid being exploited by opponents. However, human and animal subjects are often unable to make probabilistic decisions, and they cannot help but rely deterministically on past events. We studied the brain mechanisms of this fallacy in primates, and found that neural dynamics is constrained by a fundamental limitation: the integration of task events is characterized by a fixed set of timescales, and only the relative weight of different timescales can adapt to the task demands. When taking this constraint into account, the optimal strategy is to stretch memory by weighting maximally the longest timescales and counter-weighting the shorter ones. Consistently, we show that neural timescales follow the extreme-value distribution and responses display a biphasic time course. The distribution of weights predicted by the optimization process strikingly matches the experimental measurements. Our findings pose specific constraints on behavior during competitive games and highlights its underlying neural mechanisms.

Published: 16 July 2012

doi:10.1186/1471-2202-13-S1-O2

Cite this article as: Bernacchia and Wang: Stretching of memory in strategic decision making. *BMC Neuroscience* 2012 **13**(Suppl 1):O2.

Submit your next manuscript to BioMed Central
and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

 BioMed Central

* Correspondence: alberto.bernacchia@yale.edu
Department of Neurobiology, Yale University, USA