

Syddansk Universitet

Neuroeconomics and Public Health

Larsen, Torben

Published in:
NEUROTALK 2010

Publication date:
2010

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Larsen, T. (2010). Neuroeconomics and Public Health. In NEUROTALK 2010: From Nervous Functions to Treatment (CD Rom ed., Vol. I). BIT Life Sciences.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Neuroeconomics and Public Health

Torben Larsen

Coordinator EC-FP7-Homecare 222954

CAST, Southern Danish University (SDU), Denmark

E-mail: fla@cast.sdu.dk Website: www.integratedhomecare.eu

Objective: To identify and describe the parameters of the Frontal Power of Concentration (C). **Method:** Systematic review of EEG- and fMRI-studies from a neuroeconomic point of view.

Results: C is a quadripartite executive integrator depending on:

1) Limbic system (L) generates emotions and cognition towards the Frontal Cortex (FC) in a reciprocal balance¹. Chronic stress in L limiting C⁶ is indicated by baseline serum cortisol

2) Volition in the vmPFC (c) controls both cognitive prediction (dlPFC)² and emotions (OrbitoFC)³

3) Semantic memories (R) based on Hippocampal memories are recollected from the Superior Temporal Sulcus⁴

4) An intuitive visuo-spatial sketchpad in the Parietal lobe (I) that spontaneously may integrate episodic memory mismatches temporarily preserved in the Occipital lobe⁵ is a background variable depending on L.

L and c are reciprocal as indicated by a concave capacity curve. Hemispheric dominance (C>1) during insecurity is evidenced to be associated with sub-optimal decision-making⁷ while C<1 is associated with a present bias. A neuroeconomic optimum represents secured risk-taking (i.e. including a worst-case-alternative) as determined by:

$$C = Rc^2/L + \varepsilon_I \rightarrow 1$$

Discussion: How to reinforce volitional flexibility (c)? Firstly, cognitive predictions are improved by open-mindedness. Secondly, emotional control is best maintaining an appropriate level of physical fitness. Thirdly, our imagination is directly facilitated by in-depth-relaxation-procedures⁸ and visualization.

Conclusion: Five parameters of C are experimentally evidenced. Formula C predicts improved rehabilitation of large groups with chronic conditions by integrated home care which has a comparative advantage in learning due to a relaxation effect (BP↓~L↓→C↑). Further, Formula C predicts that well-organized stress-management integrating LowTech-interventions as exercise (L↓ and c↑), in-depth-relaxation (c↓) and diet (integrating L, R and c) tailored to the individual would improve public health (national life expectancy) significantly.

Selected references to the parameters of the power of concentration (C)

1. Mohanty A et al (2007): *Differential engagement of anterior cingulate cortex subdivisions for cognitive and emotional function*. Psychophys., 44: 343-351.
2. Robertson EM, Tormos JM et al (2007): *The Role of the Dorsolateral Prefrontal Cortex*. Cerebr Cort, 11:628–35.
3. Beer JS et al (2007): *Controlling the integration of emotion and cognition*. Psych Sci, 17(5):448-53.
4. Hein G, Knight RT (2008): *Superior Temporal Sulcus-It's My Area: Or Is It?* J Cogn Neurosci 20(12): 2125-36.
5. Kounios J, Frymiare JL et al (2006): *The prepared mind. Neural activity prior to problem presentation predicts subsequent solution by sudden insight*. Psychol Sci, 17(10).
6. Eggers AE (2007): *Redrawing Papez' circuit: theory how acute stress becomes chronic and causes disease*. Med Hyp, 69(4):852-7.
7. Goel V et al (2006): *Hemispheric Specializat .in PFC for Resolving Certain and Uncertain Inferences*. Cerebr Cort.
8. Manzoni GM, Pagnini F et al (2008): *Relaxation training for anxiety: a ten-years systematic review with meta-analysis*. BMC Psychiatry, 8:41. J Altern and Complem Medicine, 12(8):817–32.

About the Author

Torben Larsen is MSc Econ from Aarhus University and has a diploma in strategic management from Maryland U. He has hold posts in Danish National Board of Health, Odense University Hospital, Danish Agency of Foreign Aid, Health Authority of Funen and CAST at SDU where he is chief consultant. He has received more academic awards:

- Prize Award from the Lundbeck Foundation for dissertation on future health care organisation, 1990
- Poster Award from the European Association of Medical Informatics for ICT-system for Integrated Primary Care, 1996
- Medal of Honour from Black SeaDiab for an technical aid program to a scientific network on diabetes, 1998
- Visiting Professor at the International Institute for Advanced Studies and Cybernetics (IIAS), 2002-
- Book Award for 'Neuropsychology for Economists' from Intersymp in Baden-Baden, Germany, 2007
- Bibliography in WHO-IS-WHO-IN-THE-WORLD 2009.