



Hacking the stress system: the stress response as an adaptive trait that can work for or against you

How exercise affects the stress response

- ▶ Exercise enhances
 - ▶ Mood
 - ▶ Energy
 - ▶ Memory
 - ▶ Attention
- ▶ A single workout can raise dopamine, noradrenaline and serotonin for at about 2 hours
- ▶ Repeated exercise
 - ▶ neuroplasticity
 - ▶ Hippocampus (memory)
 - ▶ Frontal cortex (attention)
 - ▶ Brain health

Suzuki, W. (2017). *The brain-changing benefits of exercise*.

Basso, J. C., Shang, A., Elman, M., Karmouta, R., & Suzuki, W. A. (2015). *Acute Exercise Improves Prefrontal Cortex but not Hippocampal Function in Healthy Adults*. 791–801. <https://doi.org/10.1017/S135561771500106X>

Basso, J. C., & Suzuki, W. A. (2017). *The Effects of Acute Exercise on Mood , Cognition , Neurophysiology , and Neurochemical Pathways : A Review*. 2, 127–152. <https://doi.org/10.3233/BPL-160040>



Hippocampal neurogenesis

- ▶ Brain Derived Neurotropic Factor (BDNF)
- ▶ 2 pathways through which exercise stimulates BDNF
 - ▶ Myokine (muscle released protein); exercise increases levels and permeation of the blood brain barrier
 - ▶ Beta-hydroxybutyrate (a ketone released by the liver during exercise)

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Completion between
individuals vs completion
between groups

Competition between individuals

- Internal struggle between individuals within the group
- Struggle over access to mates, resources and position in the social hierarchy
- In its core, egocentric
 - Testosterone (its not aggression!!)



Intra-group conflict as a backdrop for inter-group competition

- Inter-group competition can, and often does, involve efforts to outdo one another in the extent to which victories are gained against otherwise anonymous members of targeted outgroups.



Intra-group competition

- In-group coordination
 - Teamwork
 - Cooperation
 - Leadership
 - Group-identity



Costly signalling and the free rider problem

- ▶ Humans are extremely vulnerable alone but united, we dominate almost any environment we enter.
 - ▶ Teamwork serves the group
 - ▶ But abstaining from cooperation, while reaping the benefits of the team effort serves the individual most
 - ▶ Groups need to control for free riding
 - ▶ Costly signalling
 - ▶ Hard to fake



Sosis, R., & Bressler, E. R. (2003). Signaling Theory of Religion. *CrossCultural Research*, 37(2), 211–239. <https://doi.org/10.1177/1069397103251426>
Dunbar, R., Barrett, L., & Lycett, J. (2007). *Evolutionary Psychology*.
Sun, S., Johannis, M., & Rychtář, J. (2020). Costly signalling theory and dishonest signalling. *Theoretical Ecology*, 13(1), 85–92.
<https://doi.org/10.1007/s12080-019-0429-0>

Leadership, the great undefinable !

- A minimum of 66 different theories on leadership in the expert literature
- Massive methodological issues in the field
- The main problem
 - Philosophical reflection upon phenomenological observations of behaviour in search of universal tendencies
 - Ethics?
 - Transformation?
 - Service?

Alvesson, M., & Kärreman, D. (2016). Intellectual Failure and Ideological Success in Organization Studies: The Case of Transformational Leadership. *Journal of Management Inquiry*, 25(2), 139–152. <https://doi.org/10.1177/1056492615589974>

Atwater, L. E., Mumford, M. D., Schriesheim, C. A., & Yammarino, F. J. (2014). Retraction of leadership articles: Causes and prevention. *Leadership Quarterly*, 25(6), 1174–1180. <https://doi.org/10.1016/j.leaqua.2014.10.006>



Leadership: an evolved behavioural solution to a specific problem

- ▶ Coordinated action
 - ▶ Leadership can only exist, where there is a problem to be solved, i.e. a stressor.
 - ▶ Leadership effectively modulates stress reactions
- ▶ The range of human crises, which require communal action, is so large, that it is not feasible that one behavioural action can produce effective leadership in all cases.
 - ▶ Observable behavioural and physiological changes in followers
 - ▶ Context related behavioural and physiological changes in leaders