




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

II - Social stress, reproduction and hierarchy



Stress and the social

- ▶ Stress in a social context is a double edged sword.
 - ▶ Social connection buffers the negative effects of stress
 - ▶ Social connections can themselves be incredibly stressful
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Hans Selye – The Granddaddy of stress science

- ▶ Stress as a physiological reaction to general unpleasantness.
- ▶ Selye assumed that the negative effects of stress are the result of stress hormones running out. This is not the case. Rather, at a certain point we invest so much in the stress response that other processes become neglected.

Selye, H. (1936). A Syndrome Produced by Diverse Nocuous agents. *Nature*.
Szabo, S. (2017). "Stress" is 80 Years Old: From Hans Selye Original Paper in 1936 to Recent Advances in GI Ulceration. (December). <https://doi.org/10.2174/1381612823666170622110046>



Do you have support?

- Social grooming as a predictor of mental and physical health
- Social support in post-traumatic stress disorder
- Shared hardship



Olf, M., Koch, S. B. J., Nawijn, L., Frijling, J. L., Van, M., Veltman, D. J., ... Veltman, D. J. (2014). *Social support , oxytocin , and PTSD Social support , oxytocin , and PTSD*. 8198, 9–10. <https://doi.org/10.3402/ejpt.v5.26513>

Sapolsky, R. M. (2004). Why zebras don't get ulcers: A guide to stress, stress related diseases, and coping. In *Natural History*. <https://doi.org/10.1002/cir.3880060119>

How love and oxytocin and buffer against stress (the acute “superman” neuromodulator)

- In-group investment
 - Ethnocentrism
 - Proactive coping
- Post-traumatic stress disorder

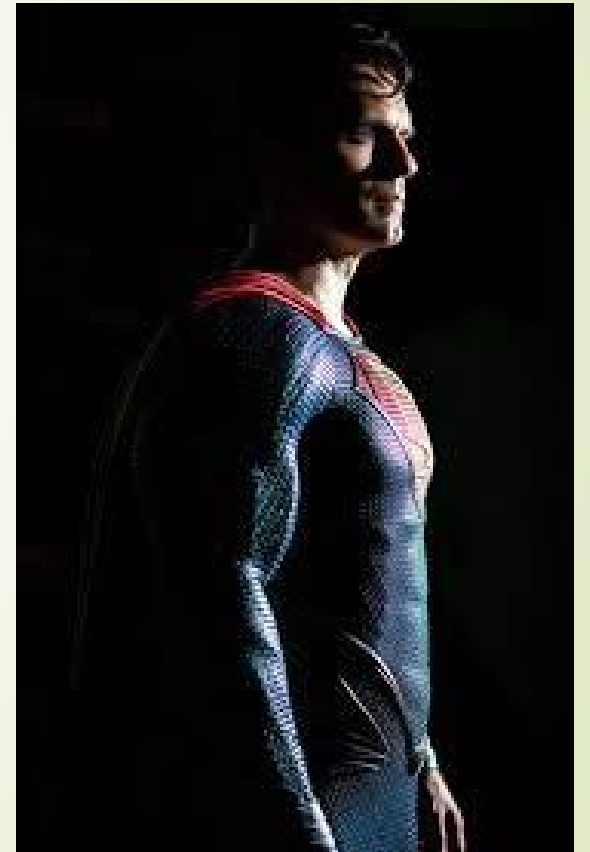
De Dreu, C. K. W., Greer, L. L., Handgraaf, M. J. J., Shalvi, S., Van Kleef, G. A., Baas, M., ... Feith, S. W. W. (2010). The neuropeptide oxytocin regulates parochial altruism in intergroup conflict among humans. *Science*, 328(5984), 1408–1411.

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Nawijn, L., Zuiden, M. Van, Koch, S. B. J., Frijling, J. L., Veltman, D. J., & Olf, M. (2017). Intranasal oxytocin increases neural responses to social reward in post-traumatic stress disorder. (October 2016), 212–223. <https://doi.org/10.1093/scan/nsw123>




Example 1: Chris Hickman. The fire fighter who lifted a car (2008)



Example II: Mjr. Robert Cane





The follower neuromodulator: β -endorphin

- ▶ μ -Opioid agonist
 - ▶ Opiate drugs act upon this receptor
 - ▶ Trauma in heroin addicts
 - ▶ Opiate abuse among PTSD sufferers
 - ▶ Morphine & PTSD susceptibility
 - ▶ Social connection as a treatment option for PTSD
 - ▶ μ -Opioid receptor / Galanin 1 receptor heteromers in the tail of the ventral tegmental area.
 - ▶ Analgesia
 - ▶ Passive coping

Serafini, R. A., & Zachariou, V. (2019). Opioid-galanin receptor heteromers differentiate the dopaminergic effects of morphine and methadone. *Journal of Clinical Investigation*, 129(7), 2653–2654. <https://doi.org/10.1172/JCI128987>

Ullrich, D., & Mac Gillavry, D. W. (2021). Mini-review: A possible role for galanin in post-traumatic stress disorder. *Neuroscience Letters*, 756(May), 135980. <https://doi.org/10.1016/j.neulet.2021.135980>

How to increase β -endorphin

- Collective exercise and hardship
 - Sports
 - Struggle
- Collective rituals
 - Uniforms & behaviours
 - Religious ritual
 - Unity with God
- Pain

Harber, V. J., & Sutton, J. R. (1984). Endorphins and Exercise. *Sports Medicine: An International Journal of Applied Medicine and Science in Sport and Exercise*, 1(2), 154–171. <https://doi.org/10.2165/00007256-198401020-00004>

Lang, M., Bahna, V., Shaver, J. H., Reddish, P., & Xygalatas, D. (2017). Sync to link: Endorphin-mediated synchrony effects on cooperation. *Biological Psychology*, 127(June), 191–197. <https://doi.org/10.1016/j.biopsycho.2017.06.001>

Corder, G., Castro, D. C., Bruchas, M. R., & Scherrer, G. (2018). Endogenous and Exogenous Opioids in Pain. *Annual Review of Neuroscience*, 41(1), 453–473. <https://doi.org/10.1146/annurev-neuro-080317-061522>



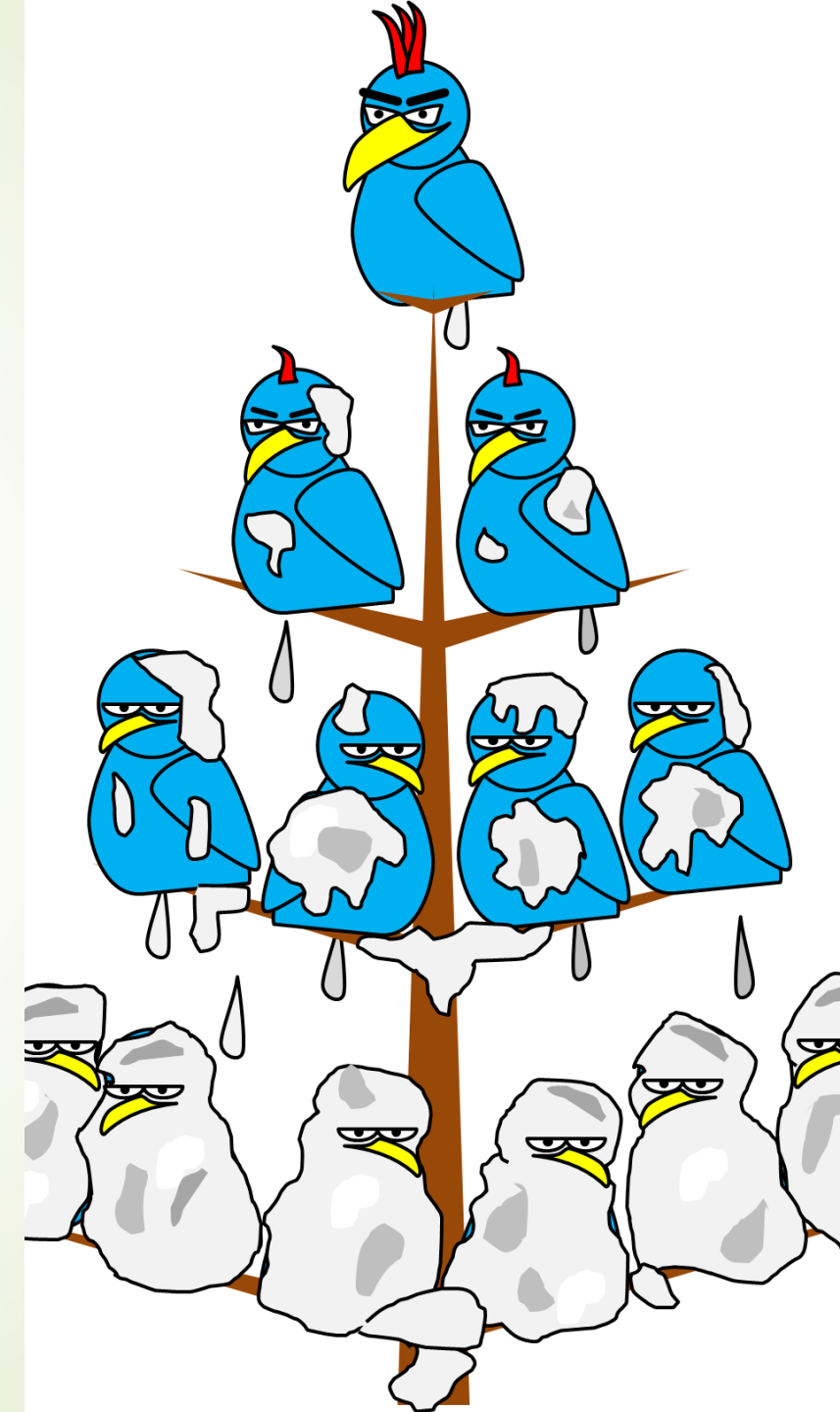
Act out!!!!

Social hierarchy and the dynamics of acting out

- ▶ We mainly act out down the social hierarchy
- ▶ In a stable social hierarchy, stress and its negative health outcomes accumulate at the bottom.
- ▶ In an unstable social hierarchy, stress effects most members equally
- ▶ Poverty, social strata and the meritocracy
- ▶ Testosterone, competition and your place on the hierarchy

Sherman, G. D., & Mehta, P. H. (2020). Stress, cortisol, and social hierarchy. *Current Opinion in Psychology*, 33, 227–232. <https://doi.org/10.1016/j.copsyc.2019.09.013>

Bernal, D. R., Ho, K., Johanna, M., & Niki, A. (2022). Second - class citizens? Subjective social status, acculturative stress, and immigrant well - being. *SN Social Sciences*, 2(7), 1–18. <https://doi.org/10.1007/s43545-022-00371-2>



Social stress: the dark side of social interaction

- ▶ Testosterone (in males)
- ▶ Serotonin
- ▶ Dopamine



Stress, reproduction and social status

- ▶ Who leaves the pack
 - ▶ Stress downregulates reproductive function
 - ▶ Stress influences access to reproduction

