



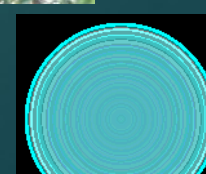
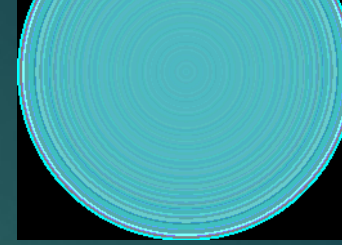
# Performing under Pressure; on the Biology, Psychology and Sociology of stress in high-performance professions

IV - ON THE SOCIAL PSYCHOLOGY OF STRESS

# Social stress and the problem of inbreeding



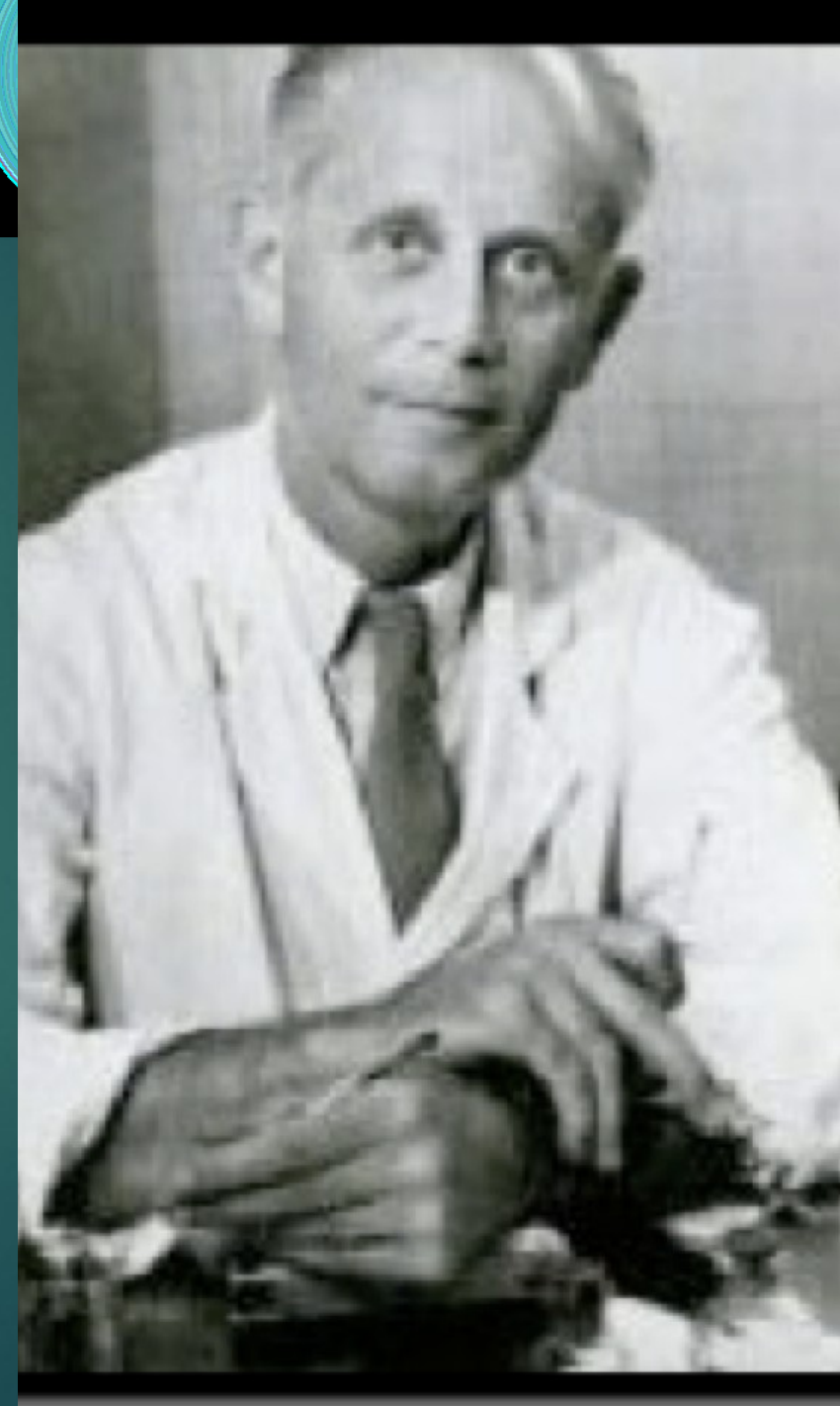
# Who leaves the troop?



# 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 an outlet?

▶ Sports

▶ Social interaction

▶ Social care





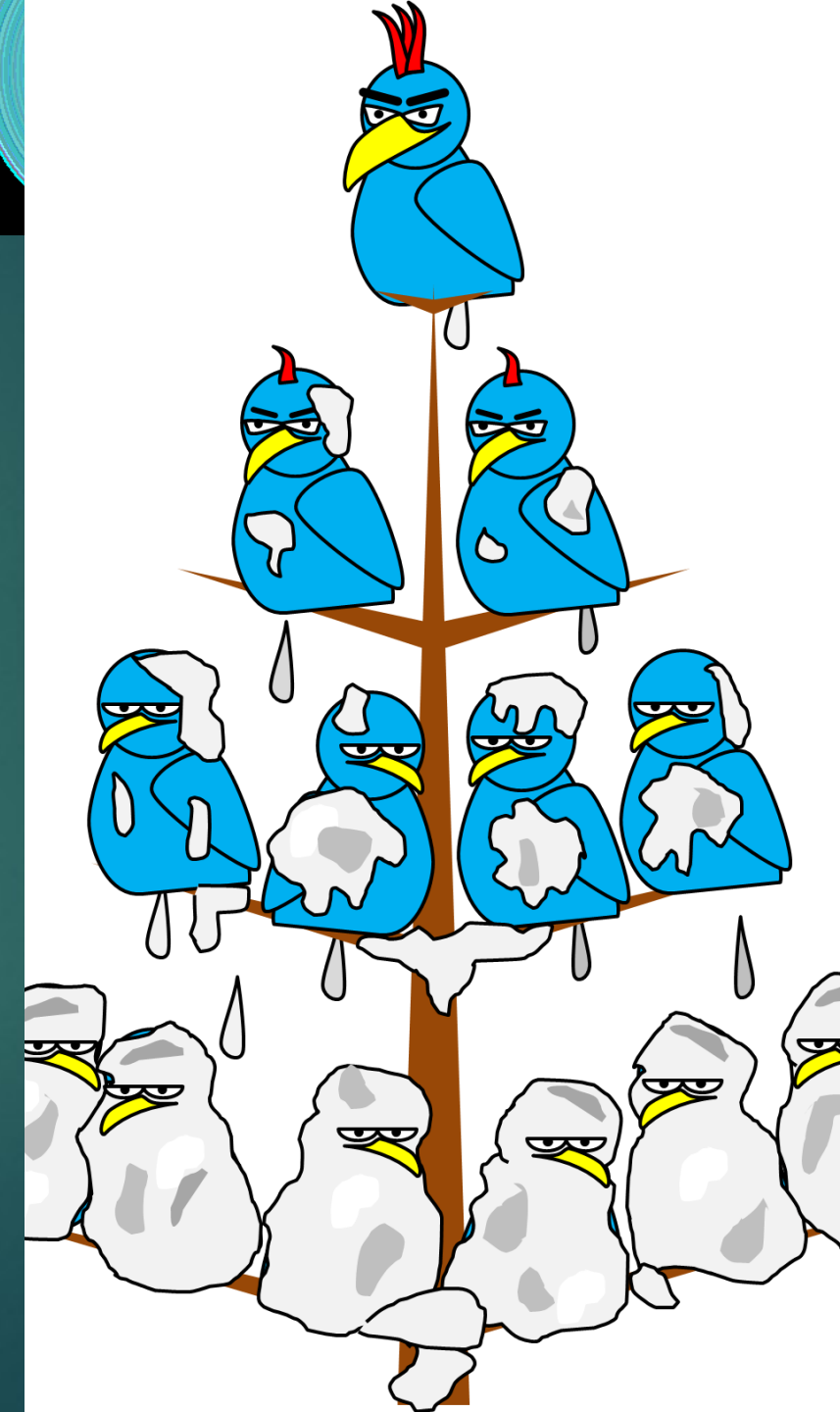
Acting out

# 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.copsy.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>



# Ideal human group size and its effects on performance: Dunbar's number

- ▶ The human frontal cortex can comfortably retain information on +/- 150 individuals.
  - ▶ Over a 150 individuals the group has to either
    - ▶ Split in two
    - ▶ Develop solutions to the emerging lack of social cohesion
      - ▶ Money
      - ▶ Formal power structures
  - ▶ Steps up from 2-5, 9-12, +/- 45, +/- 150.
    - ▶ Sports teams
    - ▶ Military company



# Your position in society and stress levels

- ▶ Village elder
  - ▶ Age and authority
  - ▶ Power and wealth as a buffer against stress
  - ▶ Testosterone and position
    - ▶ The lower down the social ladder, the more suppressed your testosterone levels will be.

Sapolsky, R. M. (2017). *Behave! The biology of humans at our best and worst*. In Penguin Press (1st ed.).  
<https://doi.org/10.1111/1467-8357.00356>

# Social connection & stress modulation

- ▶ Social connection has a strong effect on stress appraisal

- ▶ B-endorphin

- ▶ Oxytocin



# $\beta$ -endorphin

- ▶  $\mu$ -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
  - ▶  $\mu$ -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 $\beta$ -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>

# Oxytocin

- ▶ Modulates PTSD susceptibility and symptom severity
- ▶ Enhances ethnocentric/in-group sentiment
- ▶ Proactive coping

De Dreu, C. K. W., Greer, L. L., Van Kleef, G. A., Shalvi, S., & Handgraaf, M. J. J. (2011). Oxytocin promotes human ethnocentrism. *Proceedings of the National Academy of Sciences*, *108*(4), 1262–1266. <https://doi.org/10.1073/pnas.1015316108>

van Zuiden, M., Frijling, J. L., Nawijn, L., Koch, S. B. J., Goslings, J. C., Luitse, J. S., ... Olff, M. (2017). Intranasal Oxytocin to Prevent Posttraumatic Stress Disorder Symptoms: A Randomized Controlled Trial in Emergency Department Patients. *Biological Psychiatry*, *81*(12), 1030–1040. <https://doi.org/10.1016/j.biopsych.2016.11.012>

# What does this mean for peak performance?

- ▶ In-group cohesion
  - ▶ Endorphin & oxytocin
- ▶ Analgesia and resilience
- ▶ Competition vs teamwork

