



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

How do you utilise the stress response to facilitate optimal performance?

- ▶ Prepare the system for stress (See lecture 6)
- ▶ Managing the acute stress response
- ▶ Optimising the acute stress response
 - ▶ Increase dopamine
 - ▶ Increase feelings of control

Almost all of the most effective mechanisms to reduce or control the acute stress response involve feedback loops

- ▶ It is hard to control
 - ▶ Thoughts
 - ▶ Emotions
 - ▶ Physiological states
- ▶ Behaviour is much easier and that will alter all the above
- ▶ Stress often requires an expression to movement (be that physiological or psychological – behaviour is the key!)



Managing the acute stress response

Feedback loops as a means to manipulate the stress system

- ▶ Neurotropic substances
 - ▶ Benzodiazepams
- ▶ Behavioural manipulations
 - ▶ Breath work
 - ▶ Visual system control
 - ▶ Visualisation

Breath work

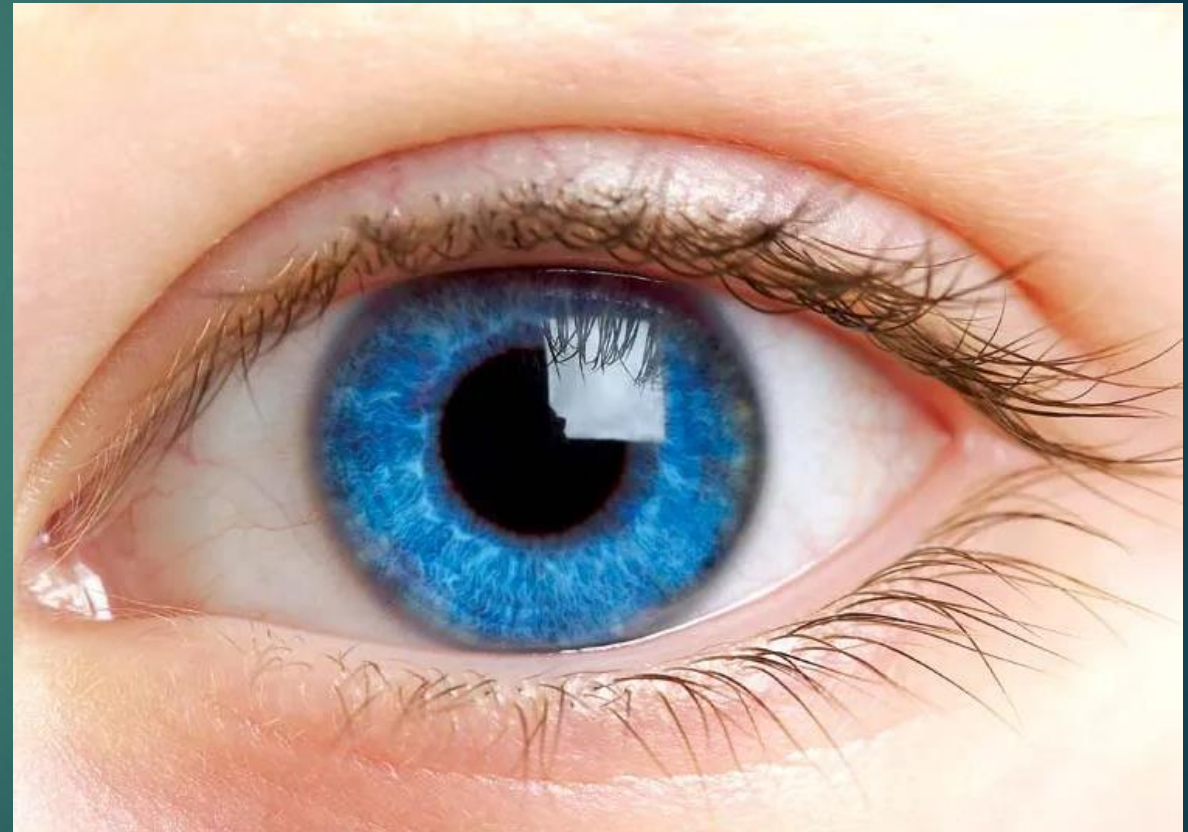
- ▶ Double sigh
 - ▶ Off load much more carbon dioxide
- ▶ Respiratory sinus arrhythmia
 - ▶ Inhales: diaphragm moves down, more space for the heart, brain sends a signal to speed up to keep blood pressure steady.
 - ▶ Basis for Heart Rate Variability (HRV)

Feldman JL. [Neurobiology of breathing control. Where to look and what to look for.](#) Advances in experimental medicine and biology, 1995.



Visual control: Can you use the eyes to control stress?

- ▶ Eyes – 2 functions
 - ▶ Detecting shapes, colours, etc. (vision)
 - ▶ Communicate to the brain – active or inactive (Cues about time of day, stressors, etc.) (YES! Another feedback loop!!)
 - ▶ Relaxed (panoramic vision)
 - ▶ Stressed (focussed vision)

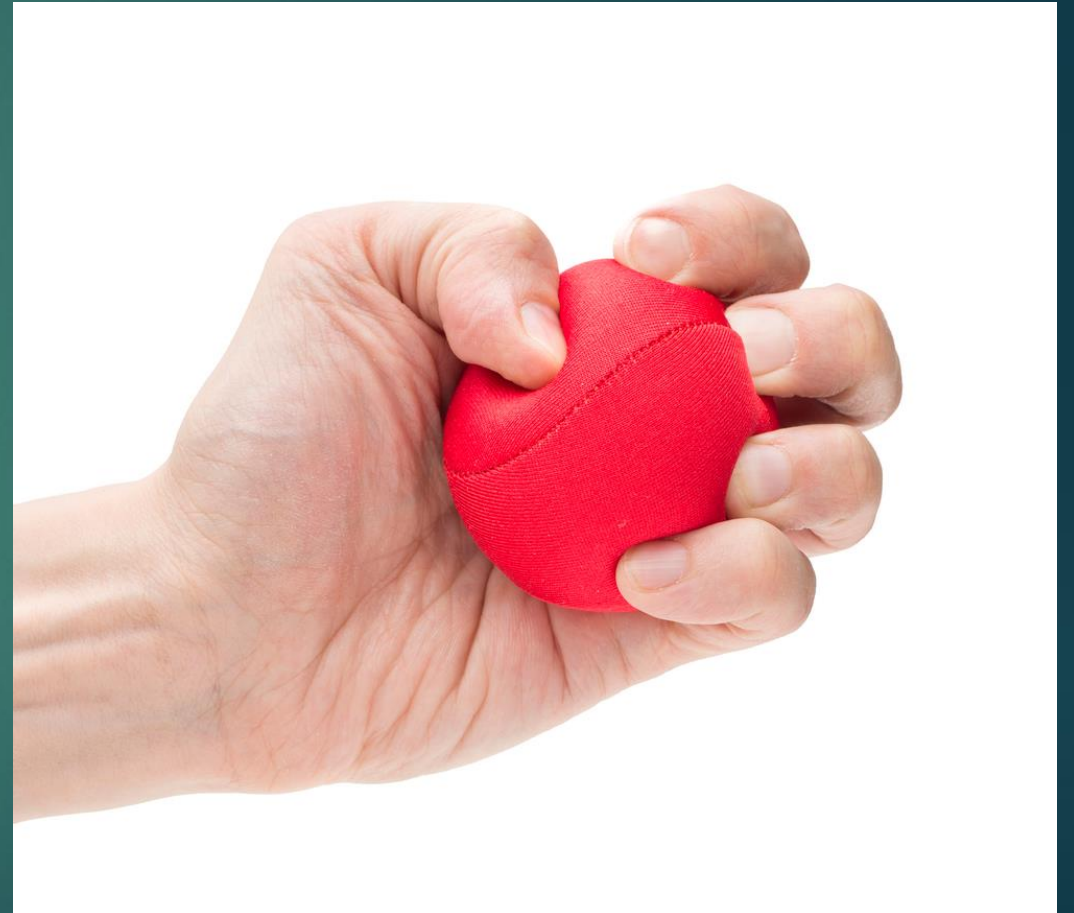


Left-brain / right brain cross talk

- ▶ Over activity in the left side of the brain may lead to overthinking
- ▶ Activity with the left hand, which cross talks to the right hemisphere, leads to an overall downregulation of brain activity

Mesagno, C., Beckmann, J., Wergin, V. V., & Gröpel, P. (2019). Primed to perform: Comparing different pre-performance routine interventions to improve accuracy in closed, self-paced motor tasks. *Psychology of Sport and Exercise*, 43(January), 73–81. <https://doi.org/10.1016/j.psychsport.2019.01.001>

Mesagno, C., & Beckmann, J. (2017). Choking under pressure: theoretical models and interventions. *Current Opinion in Psychology*, 16(June), 170–175. <https://doi.org/10.1016/j.copsyc.2017.05.015>

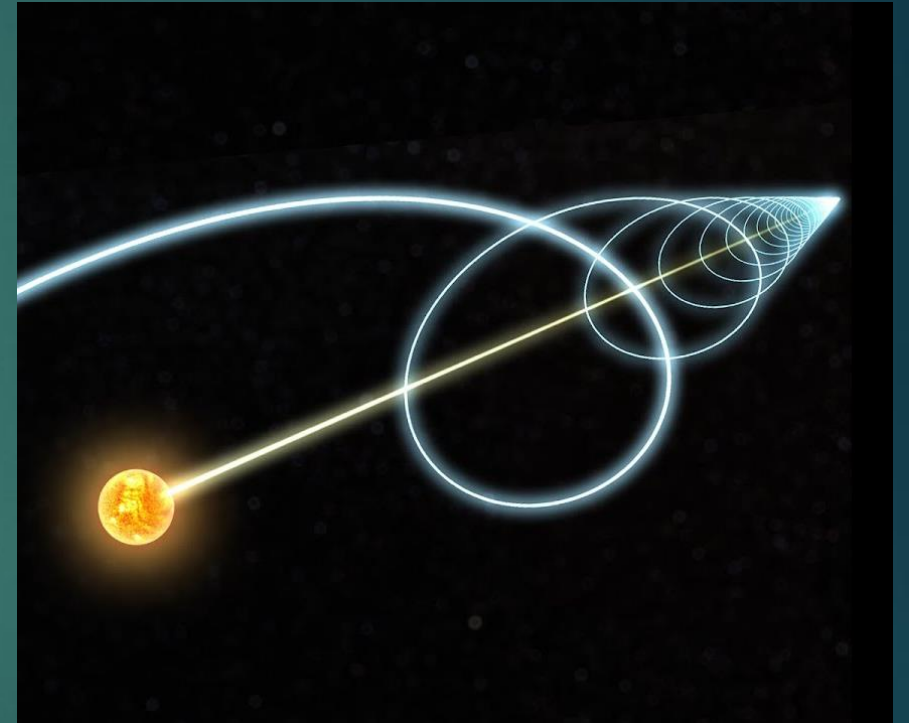




Optimising the acute stress response

Forward movement: The nucleus reuniens

- ▶ A small nucleus in the thalamus
- ▶ Secretes dopamine in response to forward movement
- ▶ Behaviour effects
 - ▶ In rats it increases willingness to fight harder
 - ▶ In people...



Nutrition

- ▶ Certain foods stimulate the endorphin and dopamine systems.
 - ▶ Sugar
 - ▶ Alcohol
 - ▶ Cacao
 - ▶ Etc.
- ▶ Careful! Many have a secondary detrimental effect.

Internal reward

- ▶ External rewards seem to be transient and unreliable. There is significantly greater value in internal rewards
 - ▶ Slice time to fit your motivational needs
 - ▶ Connect reward to accomplishment not something you get upon finishing
 - ▶ Don't engage in too many behaviours that release dopamine for little effort

Altruism: just a strange observation

- ▶ I have no data to support this, but there seems to be a strong link between resilience and altruism. Individuals who take up the responsibility to pull others through appear better at handling extreme stress
 - ▶ Special forces selection procedures

