

Exercise Neuroscience

Female life transitions and brain health

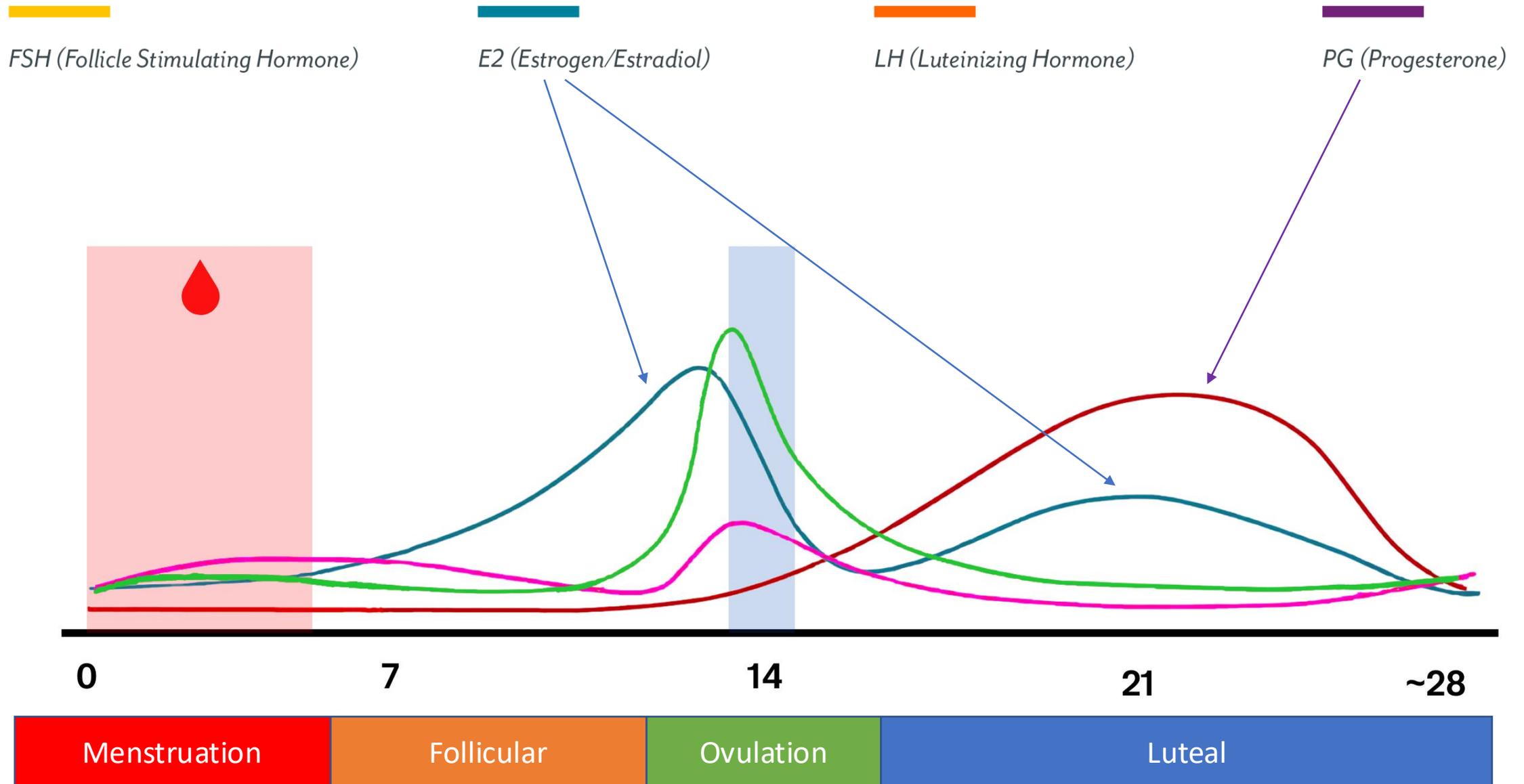
Dr Flaminia Ronca
Associate Professor
University College London (UCL)



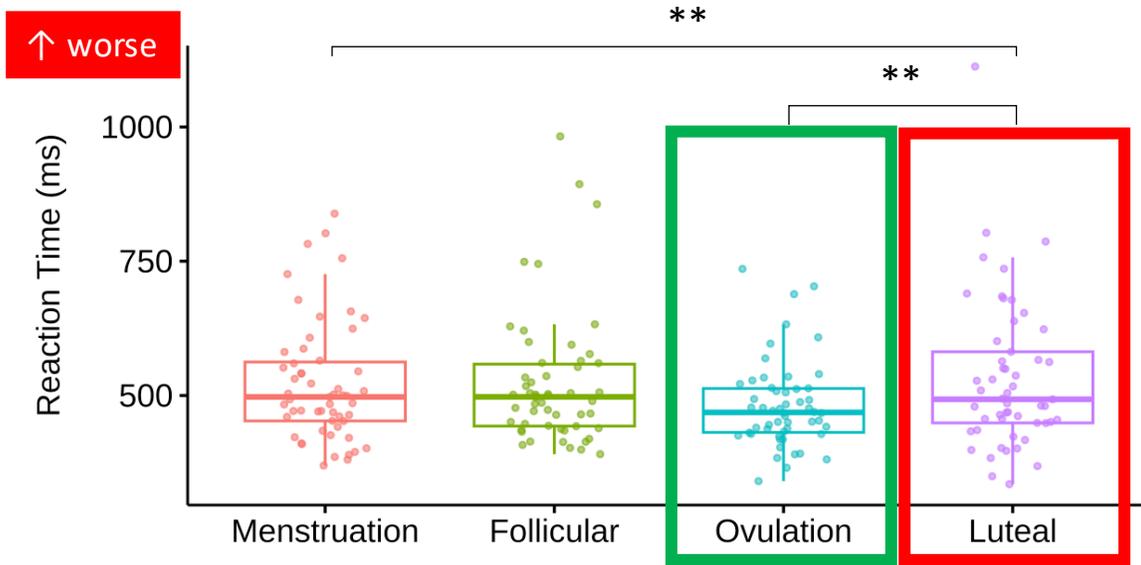
70%

Of female athletes believe their performance is affected by their menstrual cycle phase

Martin et al., 2019
Carmichael et al., 2021

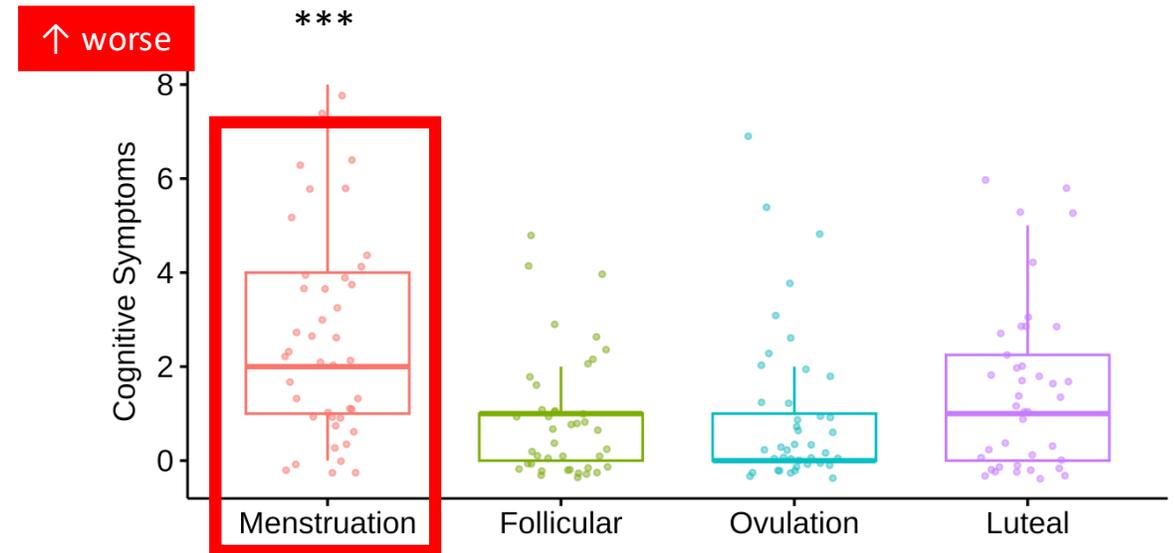
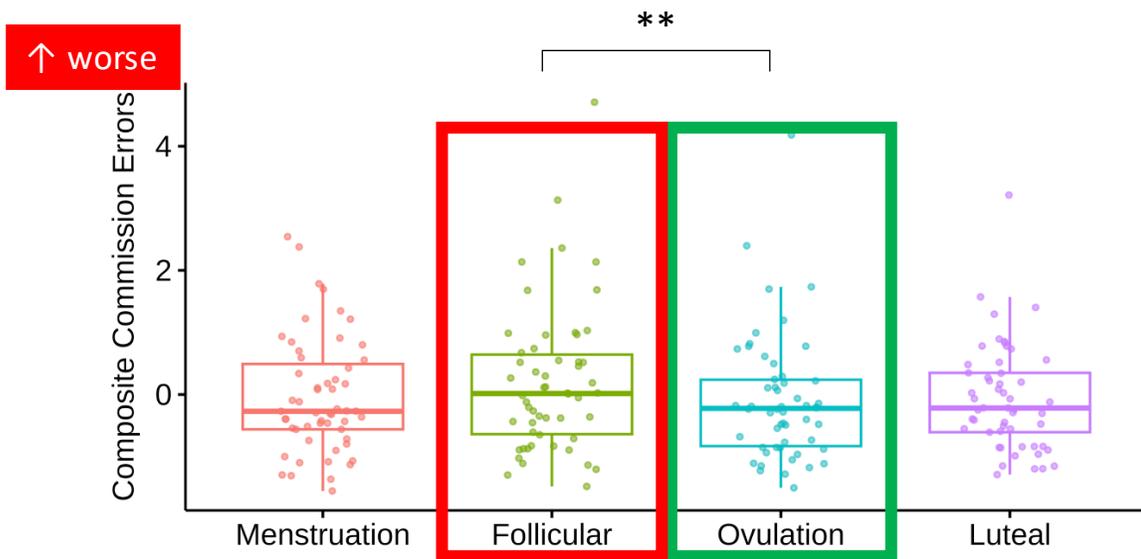


Mood and cognition vary differentially across the cycle

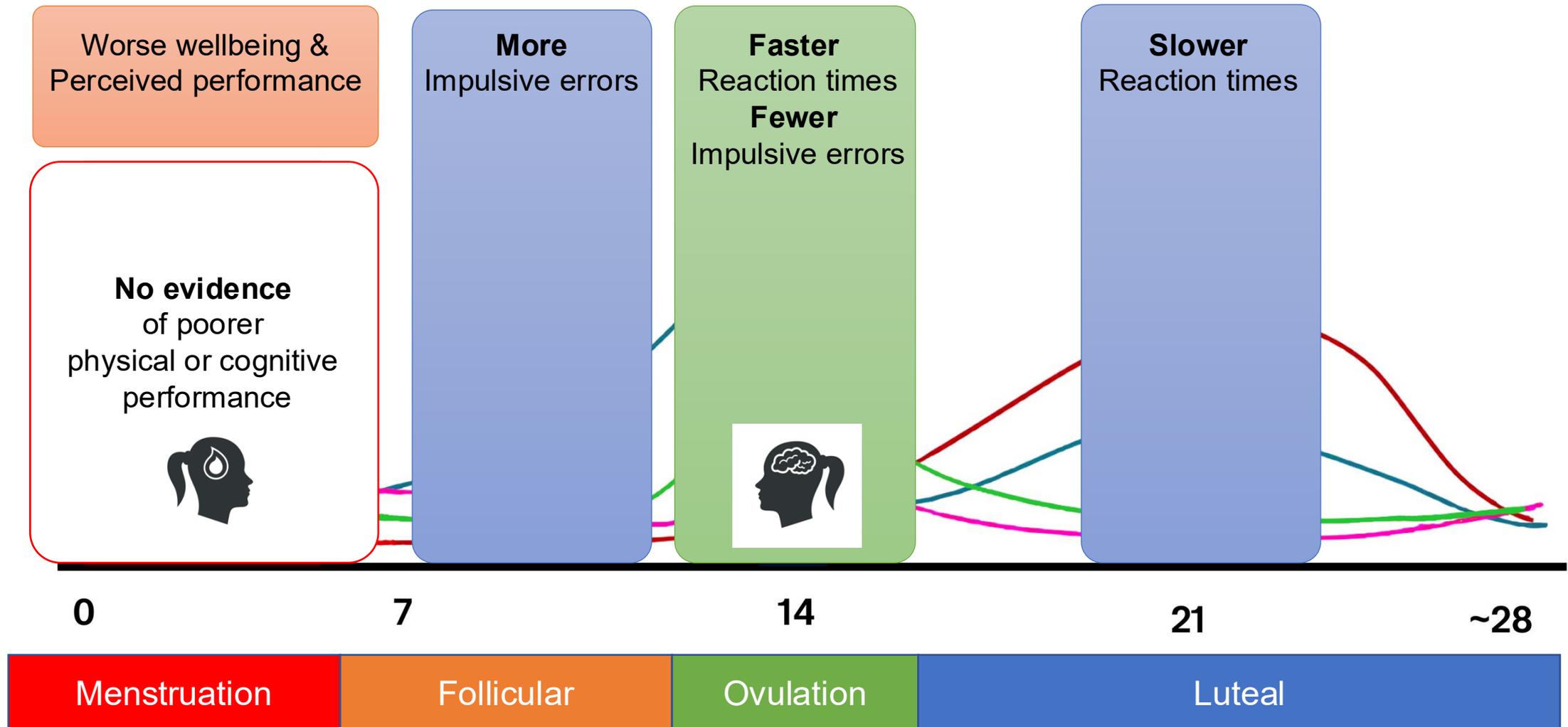


55%

Perceived worse performance during menstruation



Mood and cognition vary differentially across the cycle

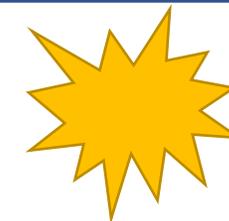


Cognitive fluctuations

Ronca et al., 2024 - *Neuropsychologia*

Ronca et al., 2025 - *Sports Medicine Open*

Lowery and Tari et al., 2026 - *Experimental Brain Research*

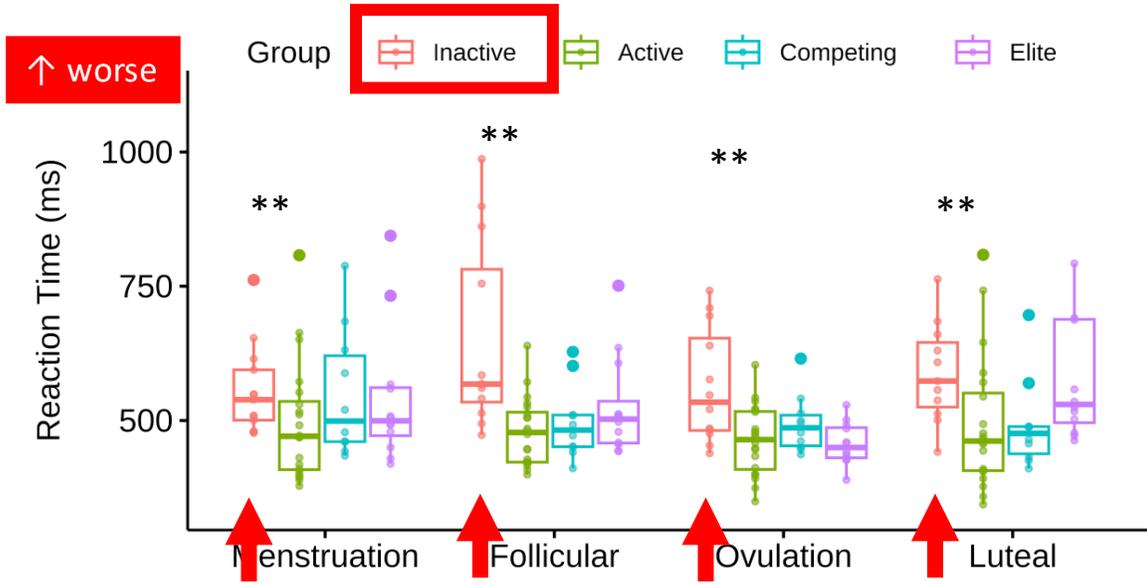


Injury incidence

Barlow et al., 2023

La Fontaine et al., 2019

Physical activity matters more than phase



Phase effect

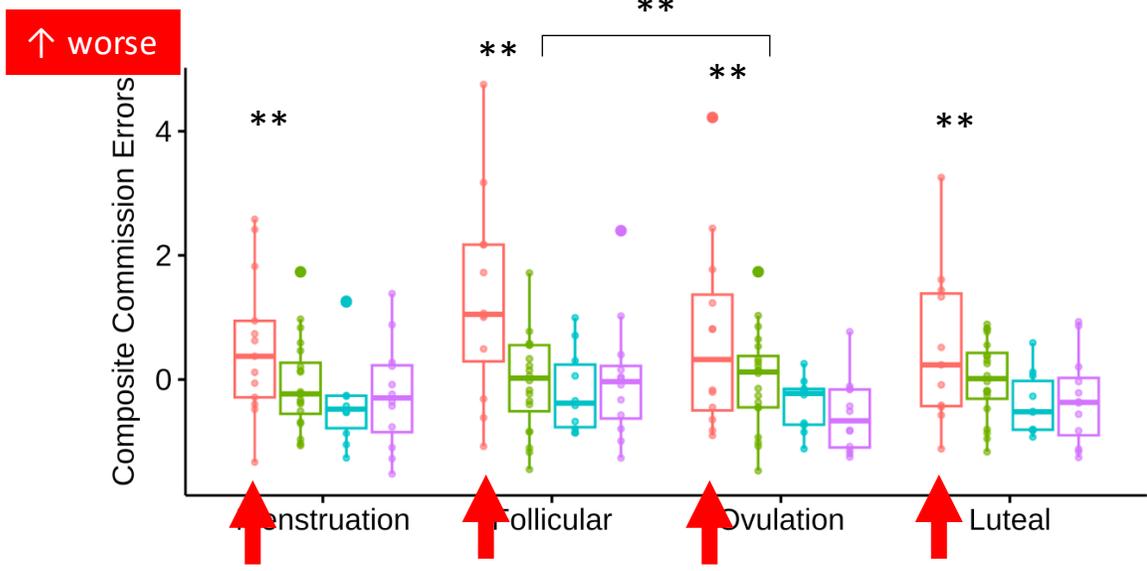
Lifestyle effect

Mid Luteal vs Ovulation

Inactive vs Active

20 ms slower Reaction times

100 ms slower Reaction times



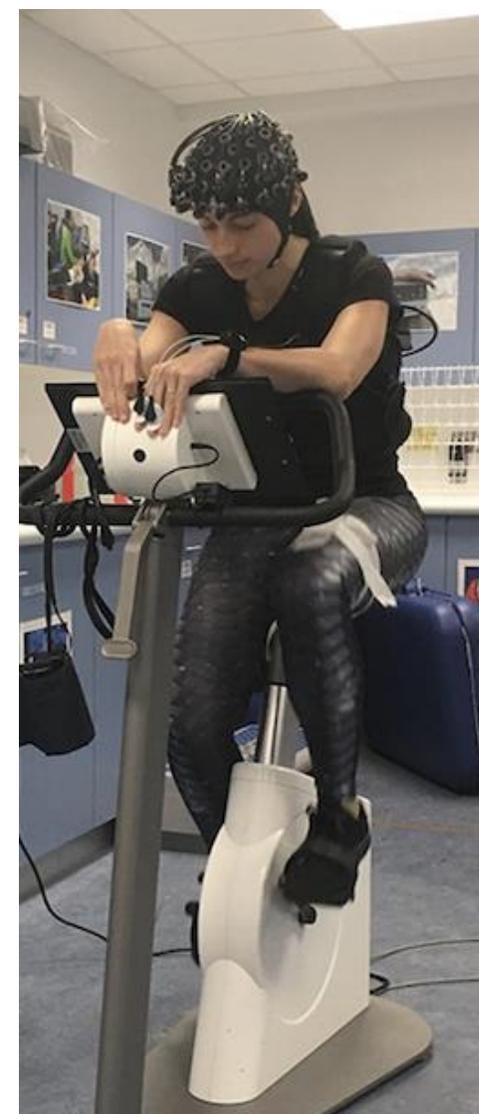
Late Follicular vs Ovulation

Inactive vs Active

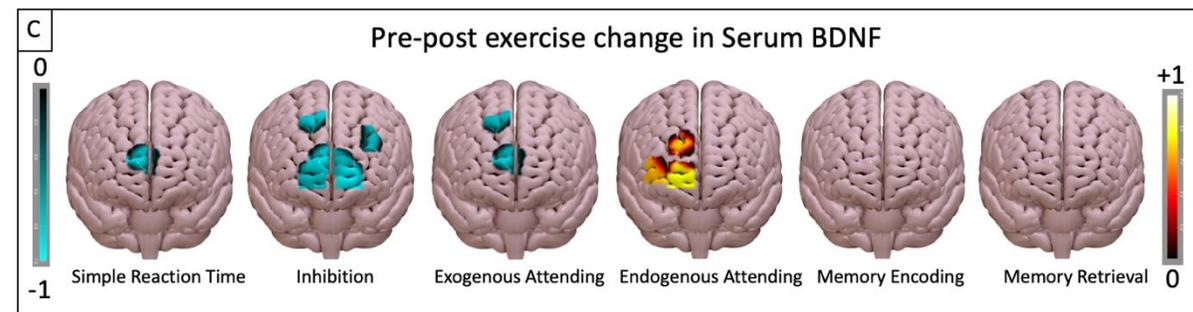
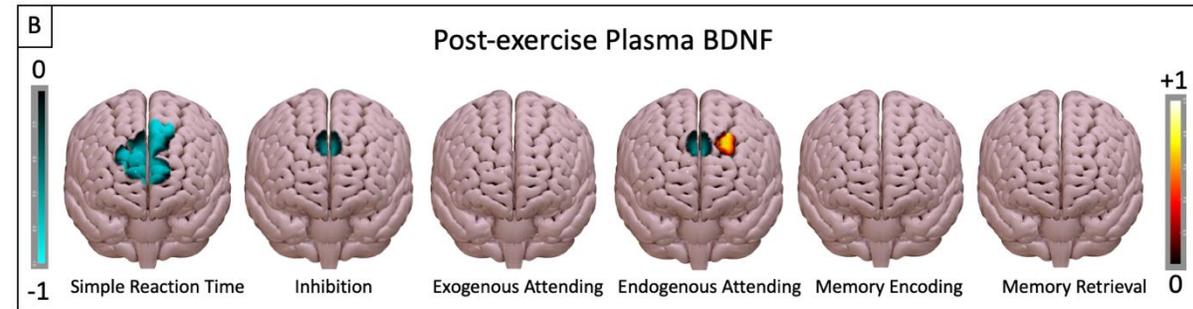
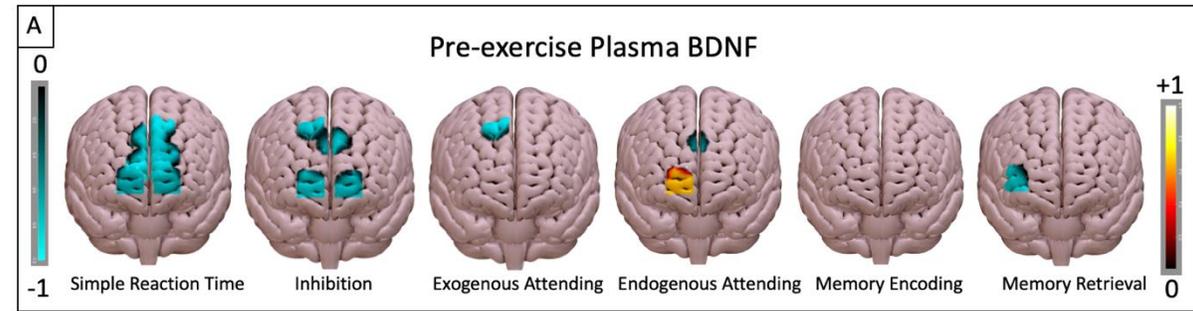
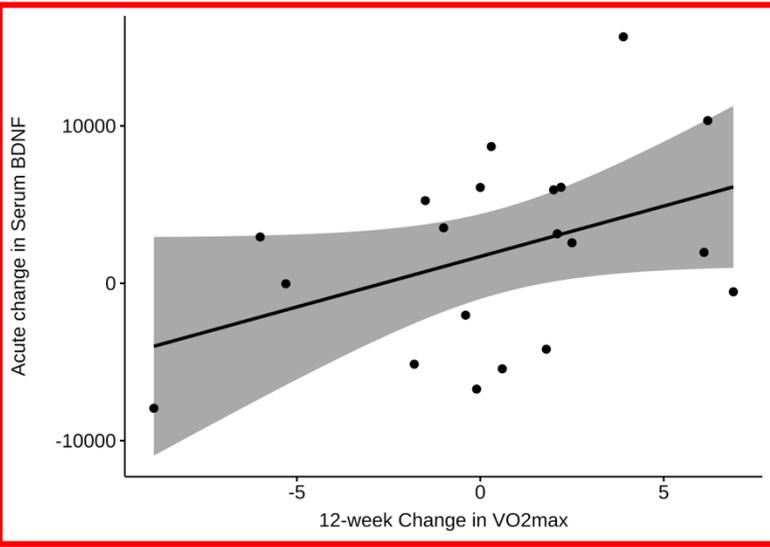
2 x more Impulsive errors

3 x more Impulsive errors

Improving fitness increases neurological benefits of exercise



BDNF release in response to exercise



Week 0	6 weeks of:	Week 8	6 weeks of:	Week 12

Physical activity matters – now and later

Perimenopausal Physical Activity and Dementia Risk: A Systematic Review

Niall Simmons, Miguel Rodriguez Ruiz, Flaminia Ronca - 2024

2.5
Hours
per week

↓
50%
dementia risk

5
Hours
per week

Greatest
benefit



Women fear a detriment to performance during menstruation

No evidence of performance drop in this phase

Menstrual cycle phase is associated with changes in mood, symptoms and cognitive performance

There is high variability between individuals

Being physically active has a bigger overall effect

Women are at greater risk of developing dementia

150 minutes per week of exercise can prevent this

Are we keeping girls active?

38% girls meet WHO guidelines

68% were inspired by the Olympic games

92% understand the Importance of being active

5% teens meet WHO guidelines

64% quit sports during puberty

76% want to be more active

21% women meet WHO guidelines

30% stop exercising during menopause

84% want to be more active

Field gap

Teen drop-off: fear of judgement, poor sports kits, unmanaged period and breast symptoms.

Adult women drop-off: menopause symptoms, fear of injury, “not sporty” terminology, crime.

Poor investment in women’s sport leads to poor accessibility, fewer opportunities, and a poor evidence-base.



Sources from:



Because women & girls belong