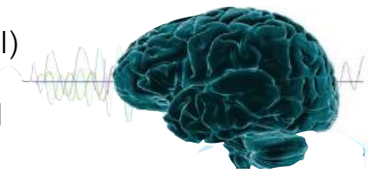
Motivation

Preterm-birth

- 11% of annual births worldwide
- Major risk of neurodevelopment problems
- Clinical consequences may last through lifetime
- Developing brain in early adolescence → potential window for intervention

Brain dynamics

- Non-invasive brain imaging using magnetic resonance imaging (MRI)
- Most studies to date rely on static analyses of brain imaging data
- Brain function is a dynamic process → dynamic analyses are crucial

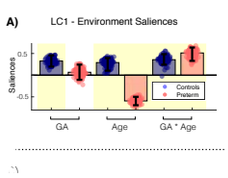


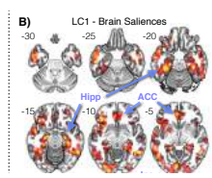
Contributions

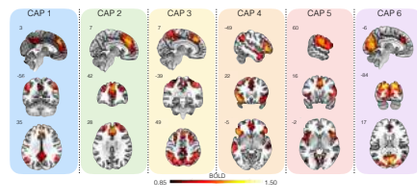
Chapter 3: Resting-state dynamics in preterm early adolescents

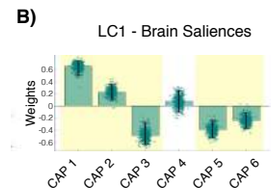
Freitas et al., *preprint, 2020*

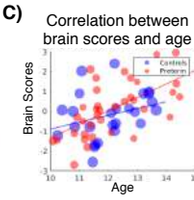
- Partial least squares correlation (PLSC) multivariate pattern analysis
- BOLD variability and co-activation pattern (CAP) analysis
- Altered development of BOLD variability and of activation patterns in the preterm



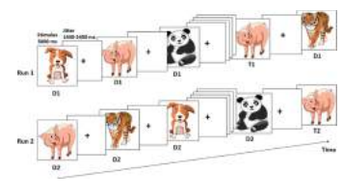








Chapter 4: Reality filtering in early adolescence

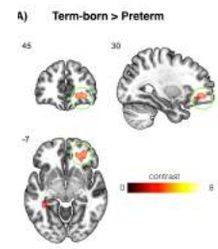


Liverani*, Freitas* et al., *Brain and Behaviour*, 2020

- Reality filtering (RF) task-based functional MRI analysis
- Orbitofrontal cortex (OFC) mediates RF in term-born early adolescents

Freitas et al., *preprint, 2020*

- Reality filtering task-based fMRI in preterm-born early adolescents
- Altered OFC activation in preterm as compared to term-born group



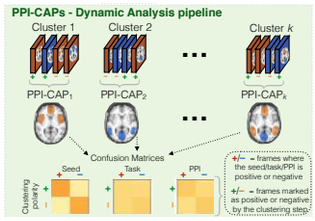
Chapter 5: Task-related dynamics and application in preterm early adolescents

Freitas et al., *NeuroImage, 2020*

- Psychophysiological interaction of co-activation patterns (PPI-CAPs)
- Time-resolved analysis of task-related effective connectivity (EC)
- Decomposed EC maps to reveal a more accurate picture of brain function

Freitas et al., *preprint, 2020*

- Early adolescents perform task alternating movie watching and emotion regulation
- PPI-CAPs uncover task-modulated patterns of activation with task, seed or group effects



PPI-CAP$_4$:

Occurrence in Time: