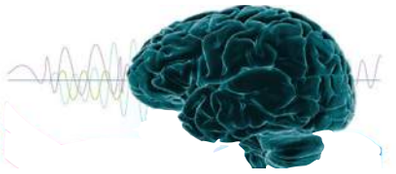
Motivation

Preterm-birth

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

Brain dynamics

- Non-invasive brain imaging using magnetic resonance imaging
- High spatiotemporal resolution
- More accurate picture of brain function

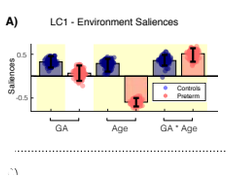


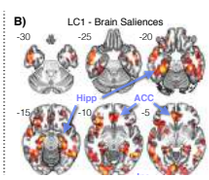
Contributions

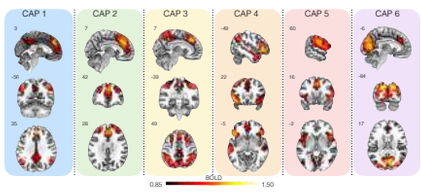
Chapter 3: Resting-state dynamics in preterm early adolescents

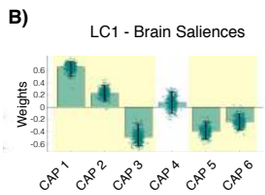
Freitas et al., *preprint, 2020*

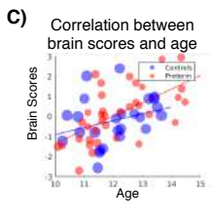
- Partial Least Squares Correlation (PLSC) multivariate pattern analysis
- BOLD variability and Co-Activation Pattern (CAP) analysis
- Altered development of BOLD variability and of activation patterns in the preterm



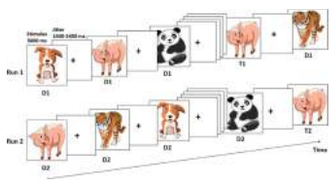








Chapter 4: Reality Filtering in early adolescence

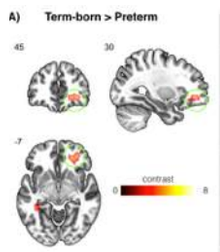


Liverani*, Freitas* et al., *Brain and Behaviour*, 2020

- 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



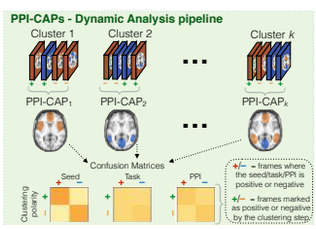
Chapter 5: Task-related dynamics and application in preterm early adolescents

Freitas et al., *NeuroImage, 2020*

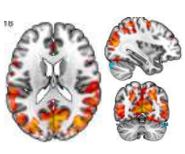
- Psychophysiological Interaction of Co-Activation Patterns (PPI-CAPs)
- Time-resolved analysis of task-related effective connectivity (EC)
- Decomposed EC maps to reveal a more accurate picture of brain function

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: