Children’s Learning of Abstract Concepts: The Role of Social Interaction

Gal Rozic, Sara De Felice, Antonia Hamilton, Gabriella Vigliocco

*Department of Experimental Psychology, University College London, London, UK
*Institute of Cognitive Neuroscience, University College London, London, UK
*Department of Psychology, Cambridge University, Cambridge, UK

**Background**

Learning Abstract Concepts
- Abstract concepts refer to entities that are detached from concrete (perceptual/motor) physical experience (e.g., currency)1,2,3.
- Substantial research is available on how children learn concrete concepts (e.g., freezer) and generalise across exemplars and categories (e.g., from freezers to appliances)4,5.

**Objectives**

1) To establish what are the individual multimodal behaviours (verbal, non-verbal) that contribute to learning of novel abstract concepts, their generalisation to other contexts, and whether the role of these behaviours differ throughout development.
2) To investigate whether behavioural and neural interaction dynamics predict successful learning, and whether they do so above and beyond individual measures.
3) To identify the behavioural factors that contribute to brain coupling within a social interaction that lead to successful learning of novel abstract concepts.

**Participants**

- 90 children aged 5-12 and their caregivers.
  - 3 main age groups: 5-6, 8-9, 11-12.
  - Native English speakers.
- Recruited through London schools, UCL PACT community, Prolific, social media.

**Novel Interactive Task**

- Multiplayer task coded in Gorilla: adult and child are shown different content in each trial.
- Data synchronisation using an Analog-to-digital converter to send triggers to the NIRS device.

**fNIRS Hyperscanning**

- Hitachi ETG 4000
- 22 channels: 8 sources, 7 detectors
- Focus on dIPFC and TPJ
- Left hemisphere

**Analysis plan and Expected Results**

- Wavelet Transform Coherence: calculating the coherence between the temporal and frequency characteristics of the signals of the two brains within a dyad, for dIPFC and TPJ, for each trial6.
- Linear mixed-effects regressions: finding the individual and coupling factors that best predict successful learning.

References:

Acknowledgments: I am extremely grateful for my thesis committee members who provide continuous feedback and support for this work: Prof. Diego Fraschini, Prof. Abdallah Foutaawi, Prof. Hugo Spera, Prof. Alessandro Lenci, Dr. Paula Prill, Dr. Anne Schultmann.