



MAX-PLANCK-GESELLSCHAFT



Learning Structure from the Ground-Up— Hierarchical Representation Learning by Chunking

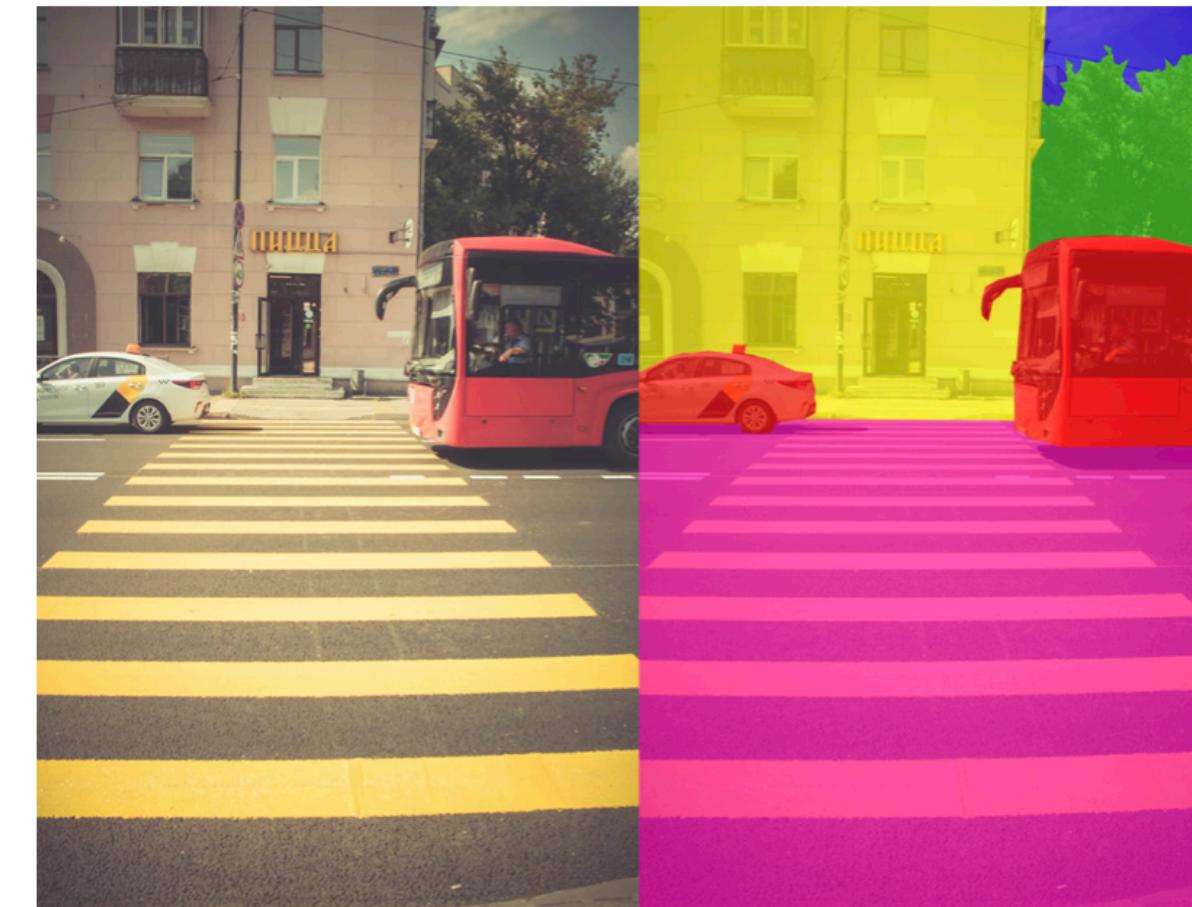
Language

... As you might know ...

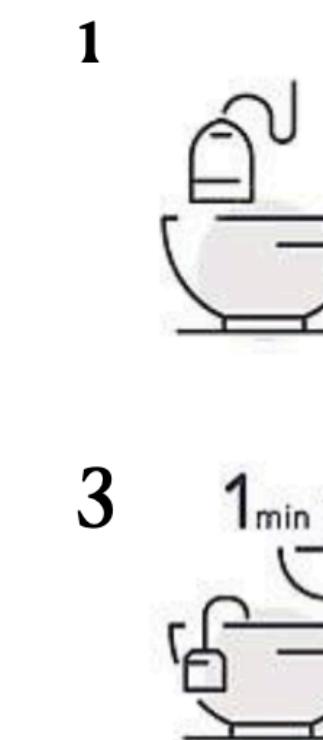
... the thing is ...

It is a bit like ...

Vision



Action



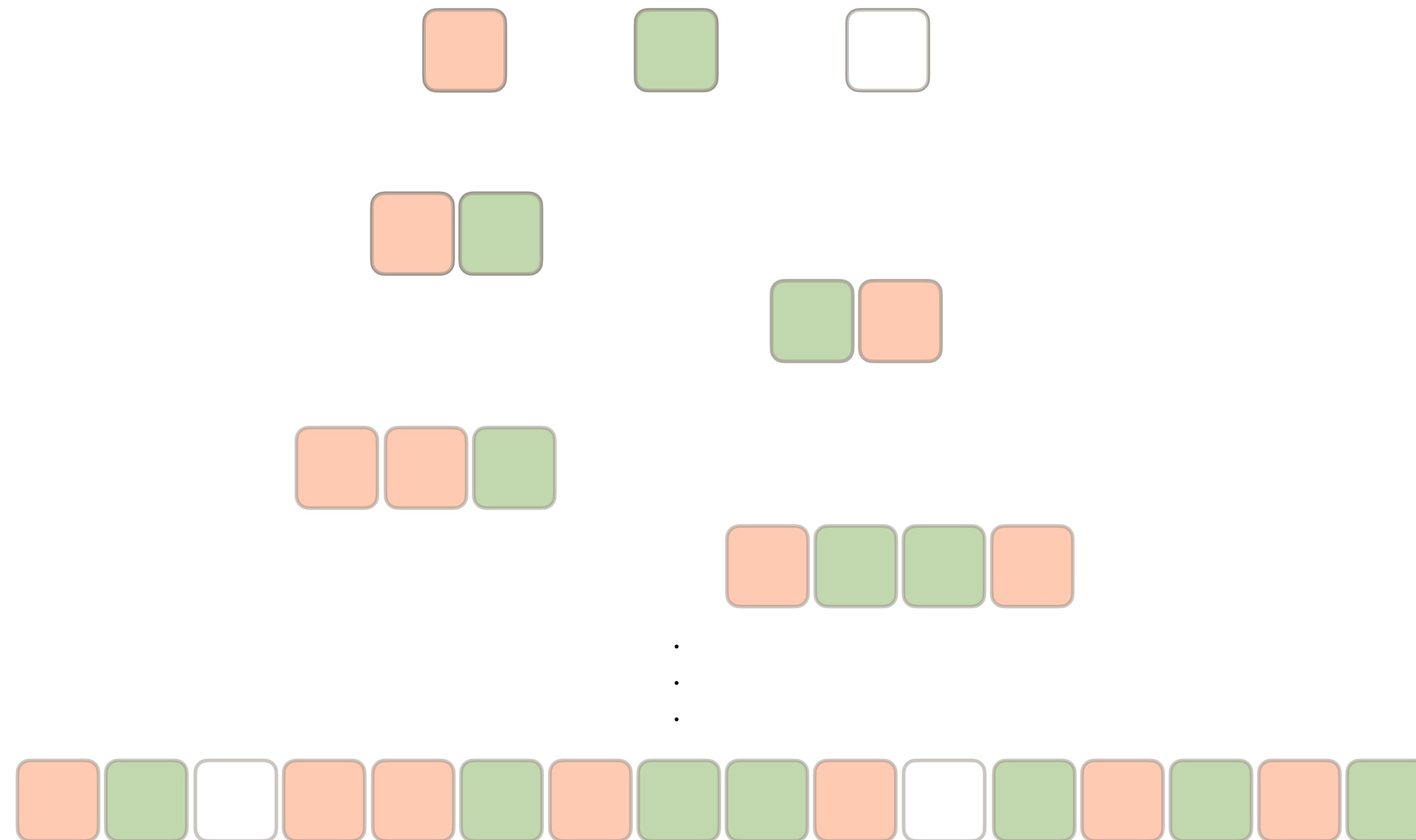
Shuchen Wu (1), Noémi Éltető (1), Ishita Dasgupta (2), Eric Schulz (1)

1. Max Planck Institute for Biological Cybernetics

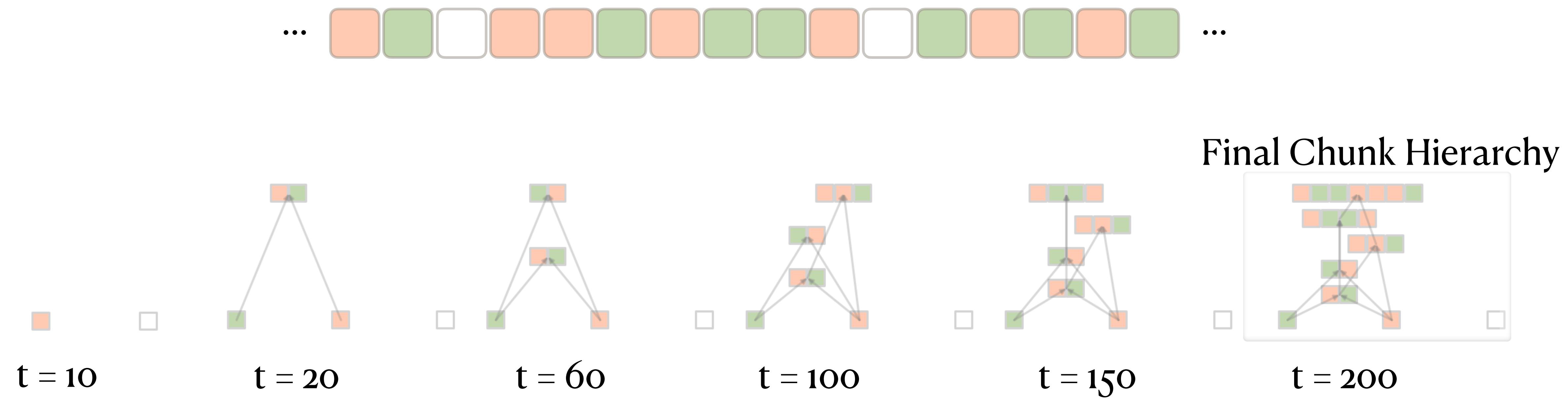
2. Google Deepmind

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A Generative Model with Embedded Hierarchy

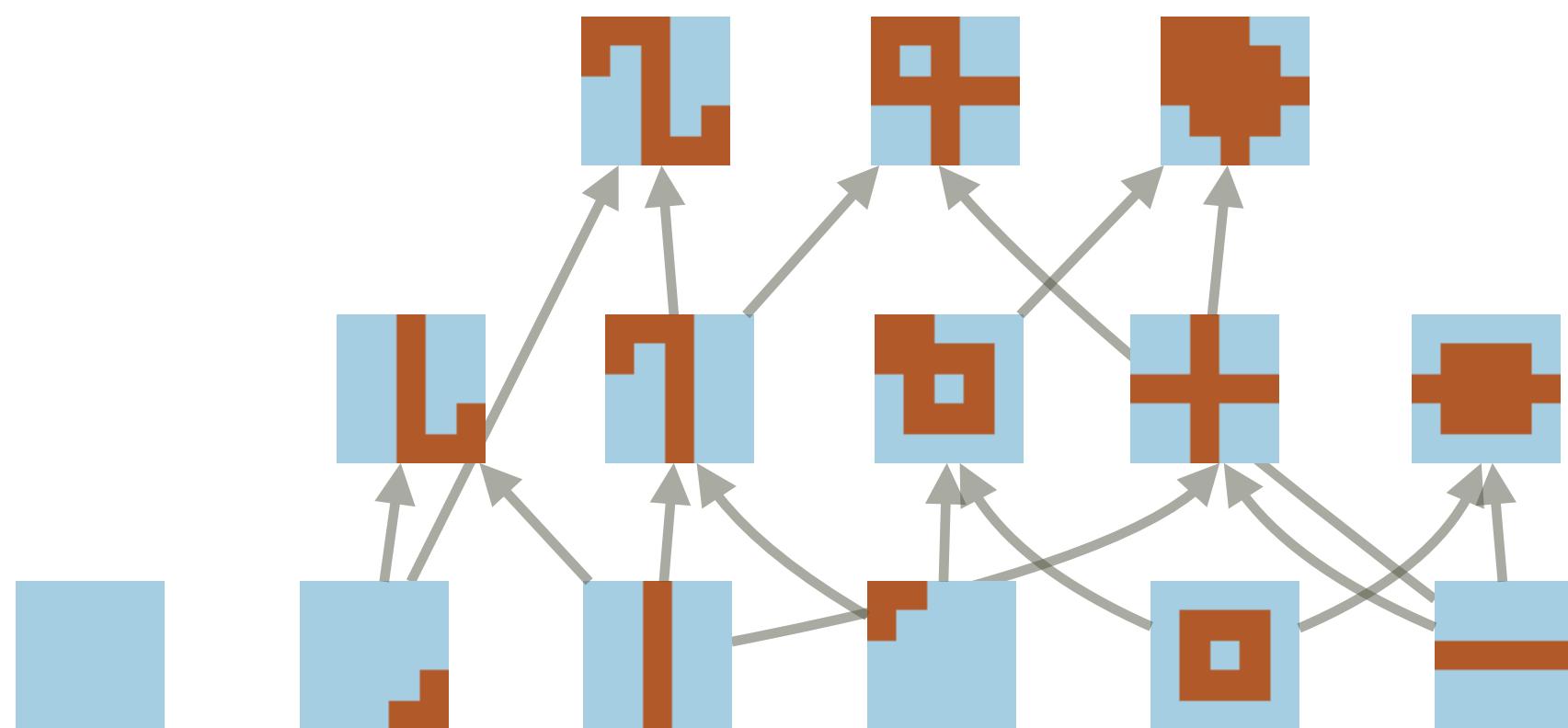


The Hierarchical Chunking Model (HCM) builds up representation as learning progresses

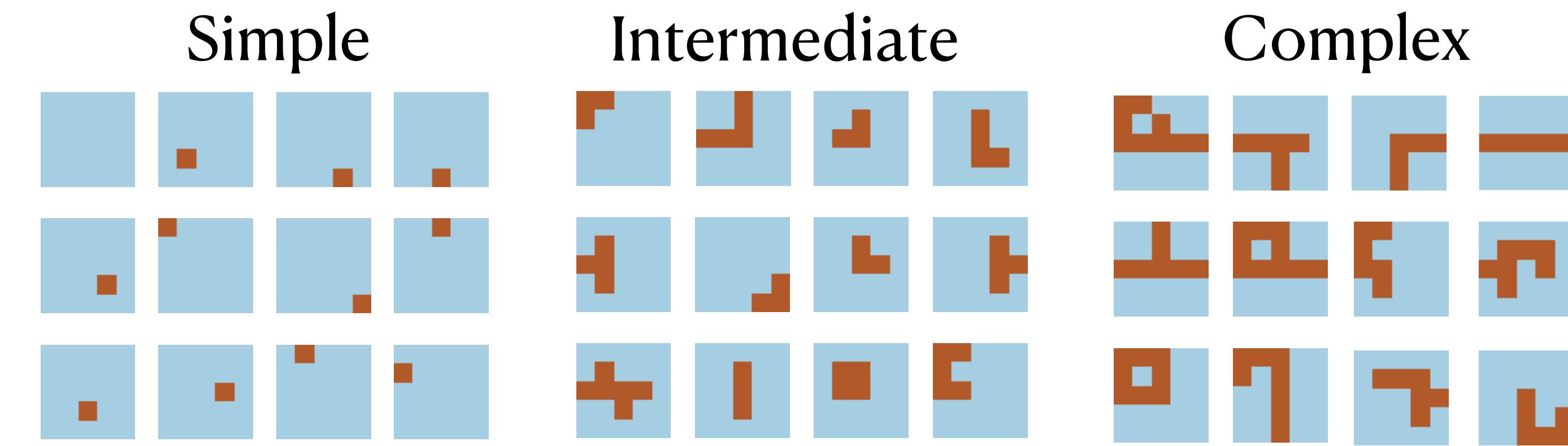


Generalizing Chunk Learning Principles to Visual-Temporal Domain

Visual Hierarchical Model



HCM Learns Compositional Structure in the Visual Domain

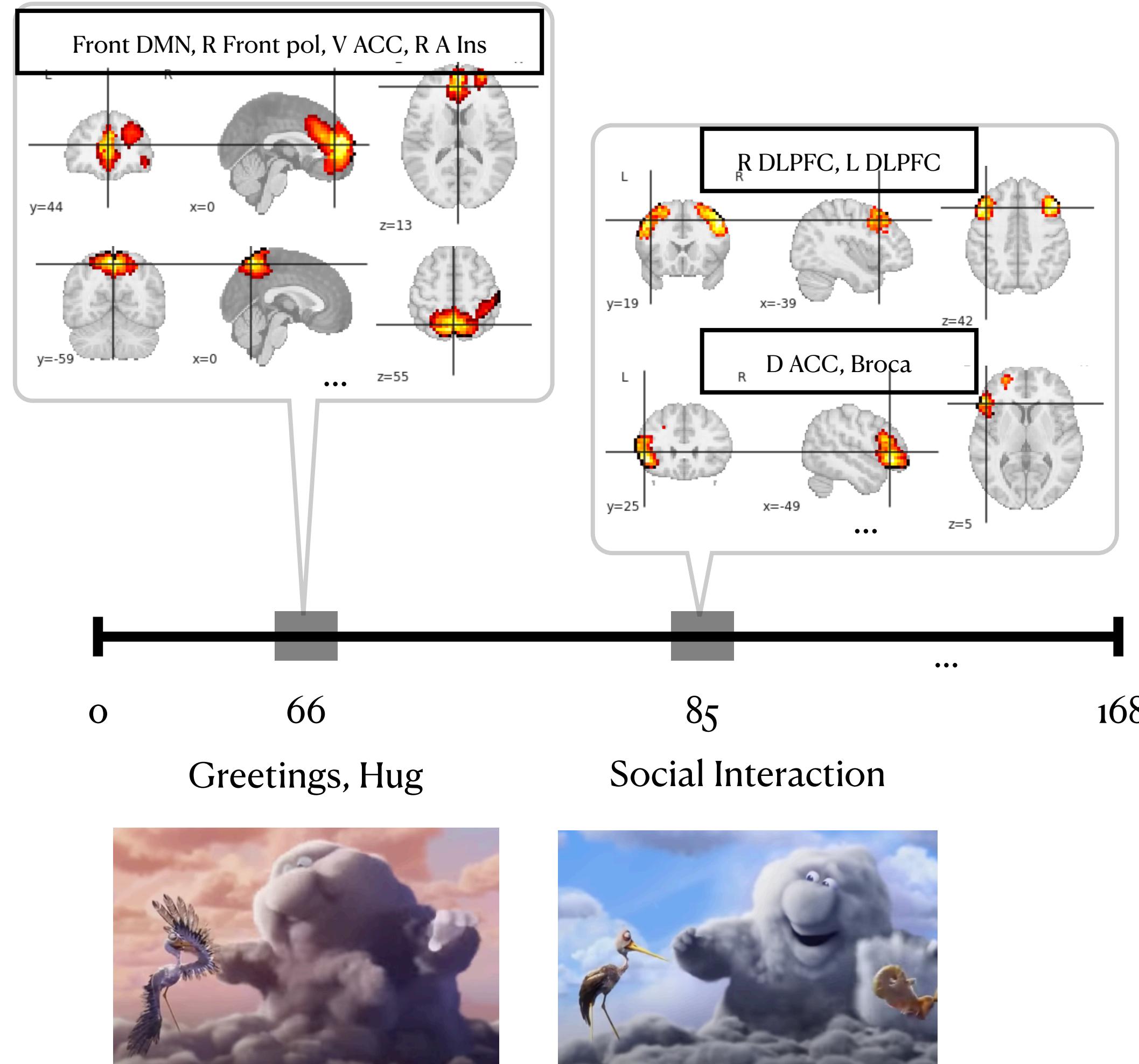


HCM Learns Part-whole Structure that Resembles Object Entities

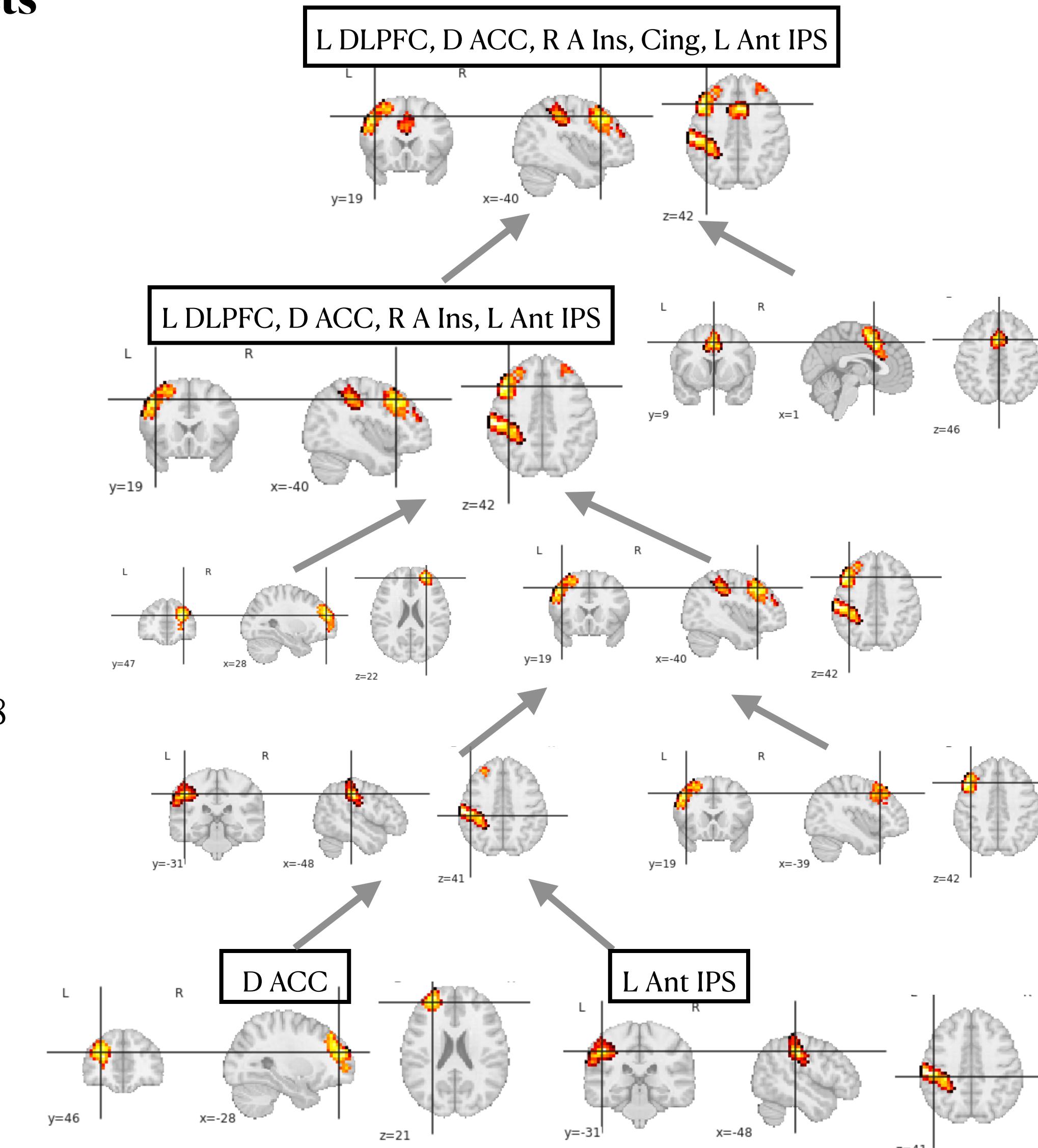


Learning Hierarchies of Brain Activation from Resting-state fMRI data

Discovering patterns of functional activity
HCM's Chunks can be Matched with Stimulus Onsets



Learning Hierarchical Activation Patterns





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Summary: Gestalt principles of grouping and theories of chunk can be understood as a rational way of learning representations from sequences with an inherent hierarchical structure

Paper in collaboration with Noémi Éltető , Ishita Dasgupta, and supervised by Eric Schulz

Link: <https://openreview.net/forum?id=LceHl9wKmoQ>

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