



Impact of development on spatial cue processing

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Introduction

Spatial navigation

1. Know position and orientation of own body in space
2. Know the location of a goal
3. Plan the path leading to that goal
4. Reorient in space after losing bearings

➔ Visual cues



Geometry



Landmarks

Stankiewicz 2007, Julian 2018

Visual cue preference

Young adults: preference for landmarks

Older adults: preference for geometry Bécu et al. Nature human behaviour, 2019

Aim: Characterize cue preference in children

Methods

Material: Immersive virtual reality setting, where subject can freely move. After various pre-tests, we decided to use the PIMAX 5k XR (FOV: 200 degrees).



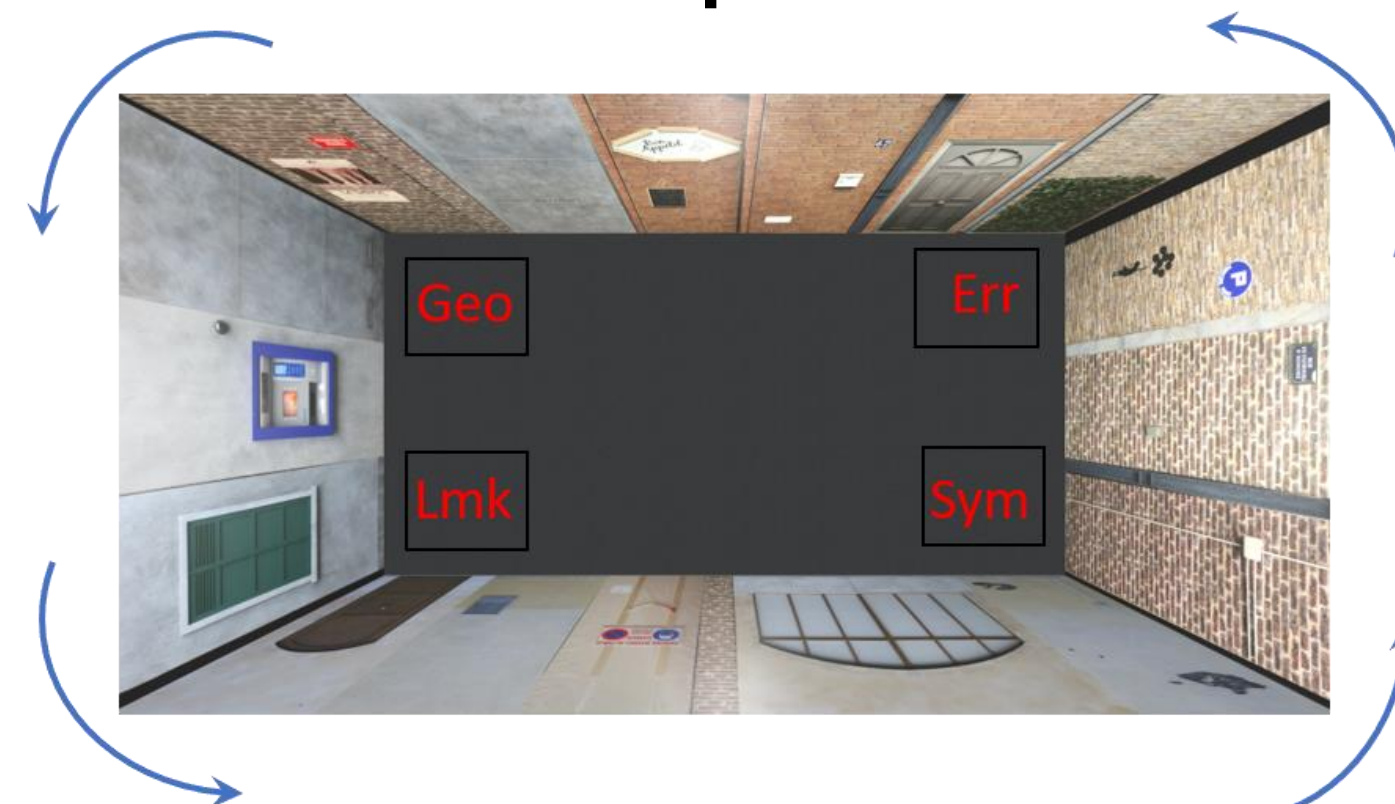
Participants: 24 children (13 males; 9-11 years old) are included in the analysis. No symptoms of cyber dizziness were ever observed during the series of VR experiments across all participants.

Spatial navigation task: Children are requested to solve a spatial navigation task by finding an invisible goal in an ecological virtual environment. Subjects are disoriented at the beginning of each trial. After learning (8 trials), the whole configuration of landmarks is rotated, creating a conflict between the landmarks and the geometry of the environment, allowing us to test cue reliance in our participants (5 probe trials).

Learning phase



Probe phase

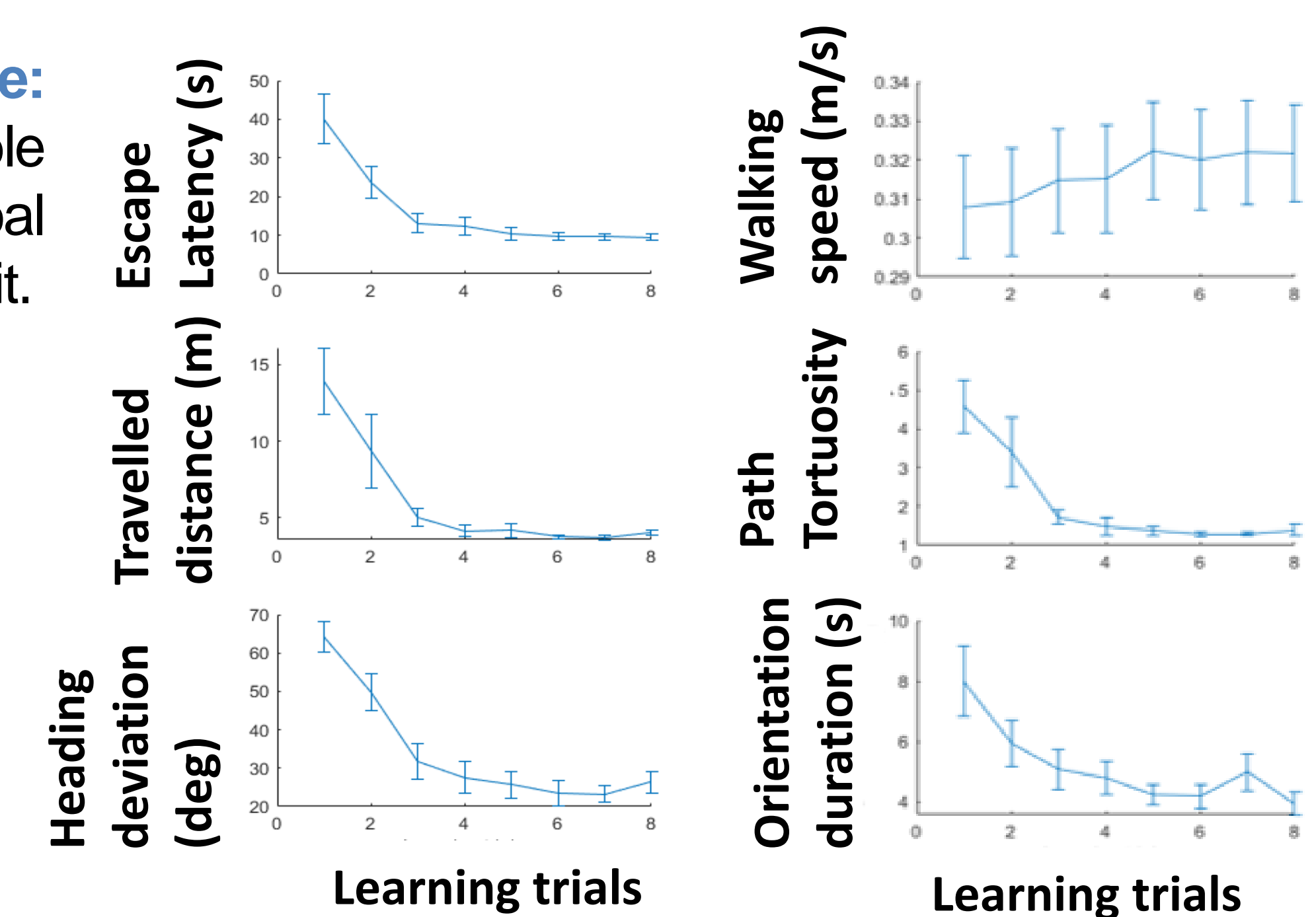


Learning and probe trial configurations

Results

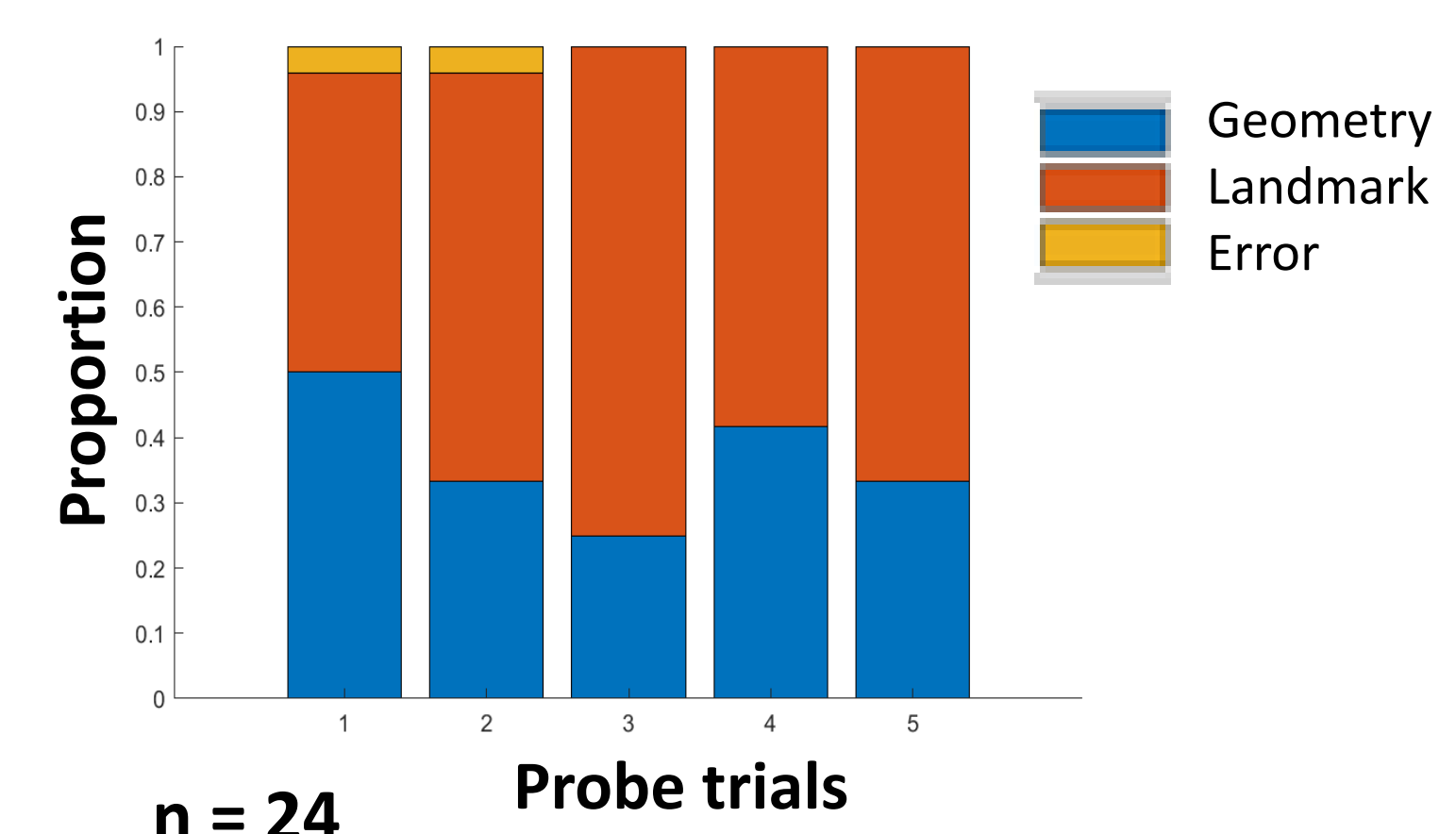
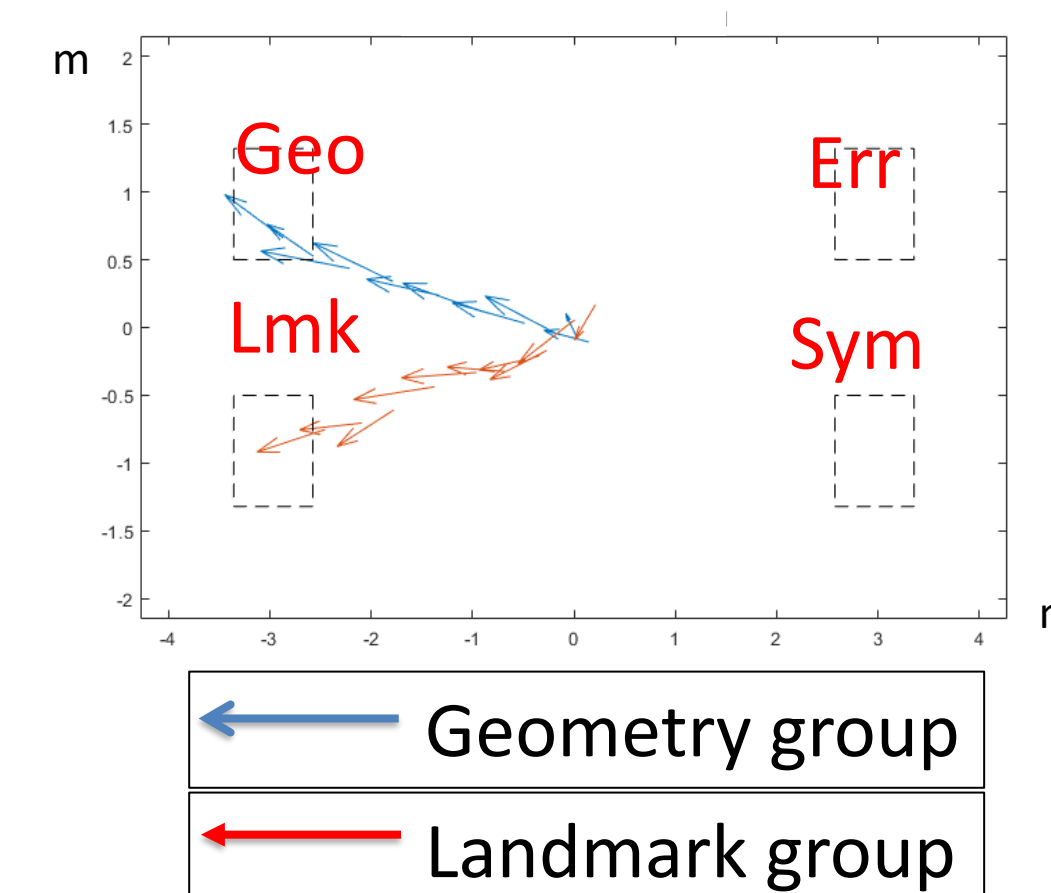
Learning phase:

Children are capable to learn the goal location and retrieve it.



Probe phase:

Mean Trajectory, 1° probe trial



First probe trial: 50% of subjects relies on geometry. There is some variability across time .

What is next?

Children

Characterization of group differences

Why proportion lmk/geo changes across probe trials?

Apply protocol to young and older adults

Methodological question: Usage of VR for spatial navigation

Perspective

Inverted U-profile of spatial cue preference across the lifespan?

