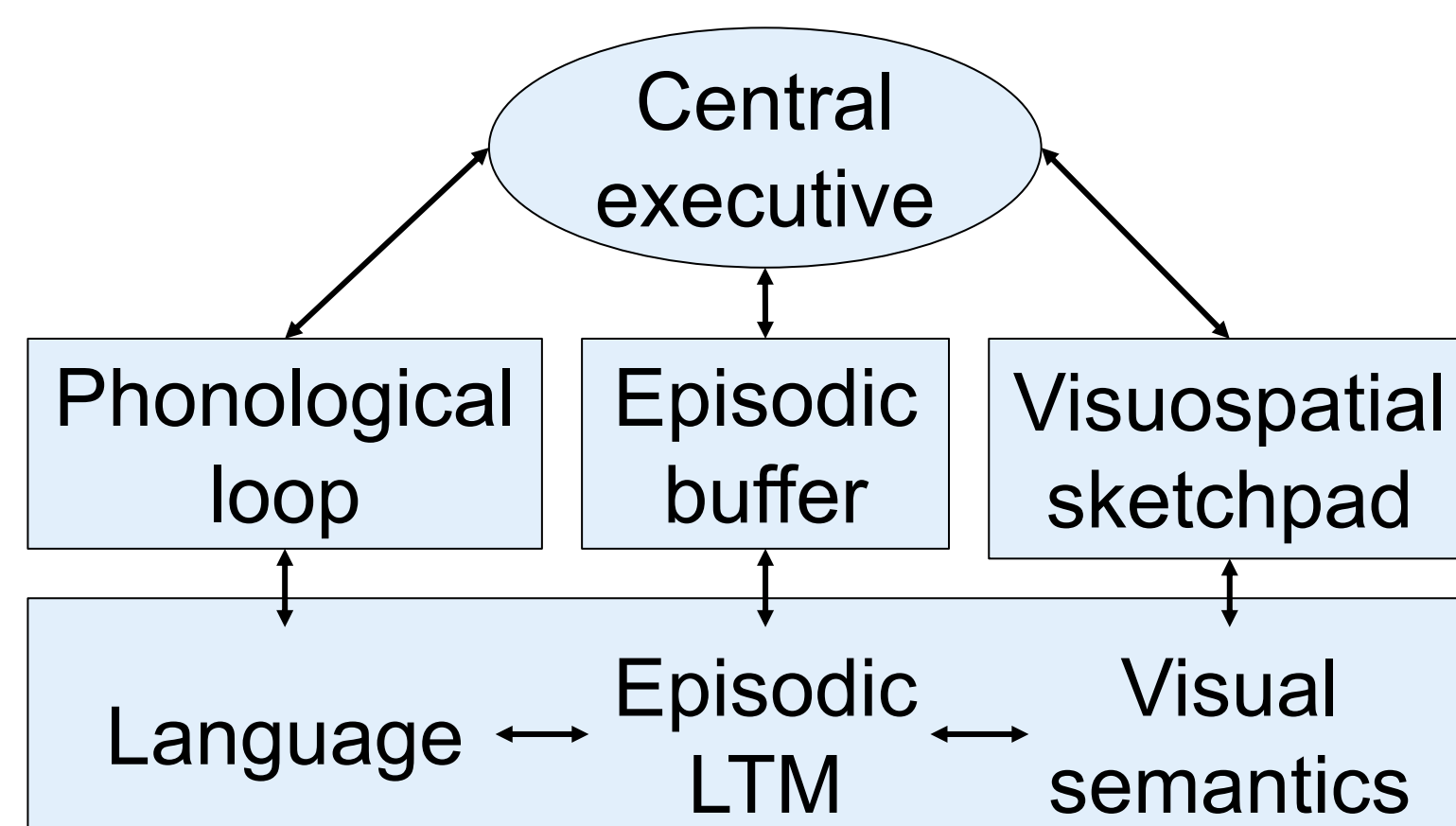
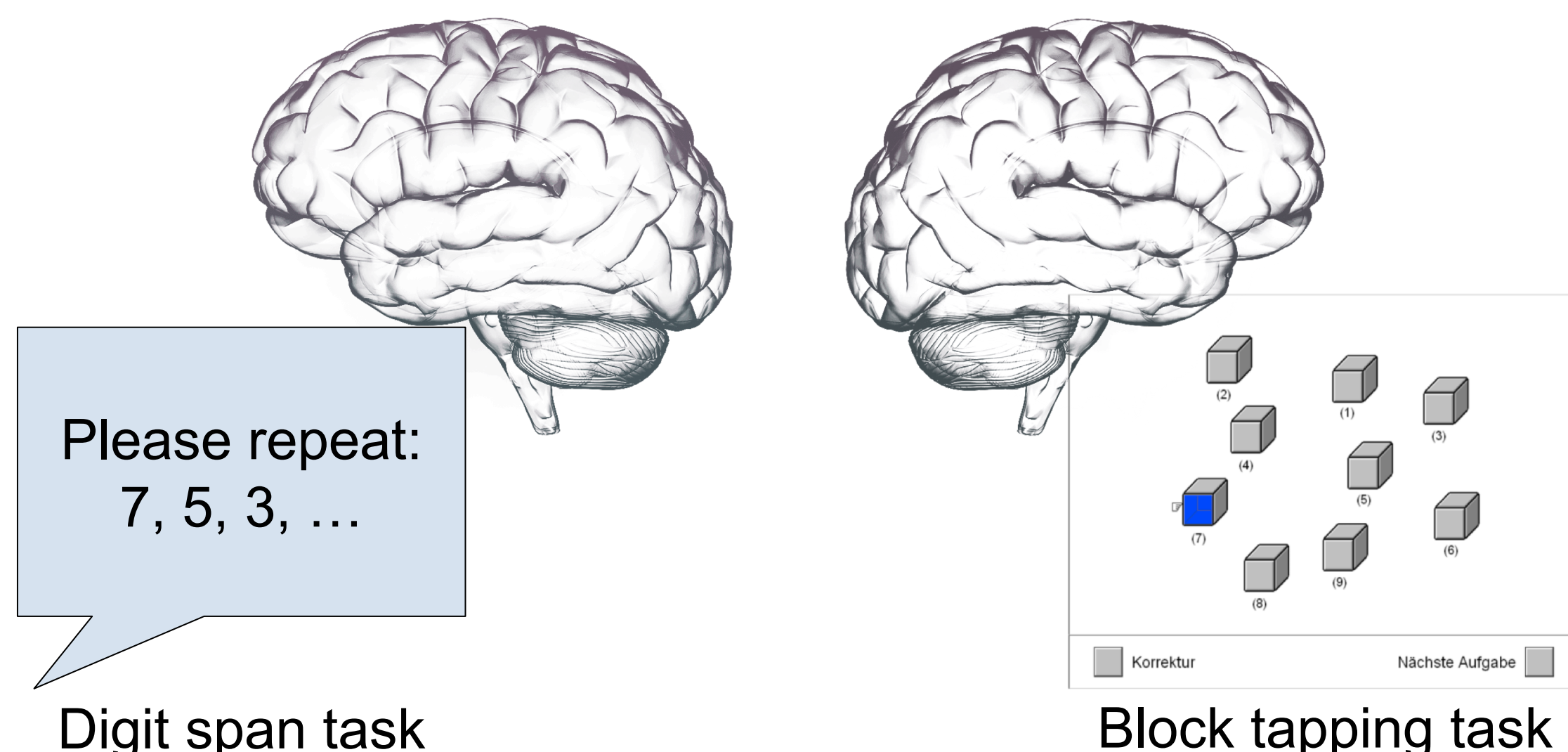


Introduction



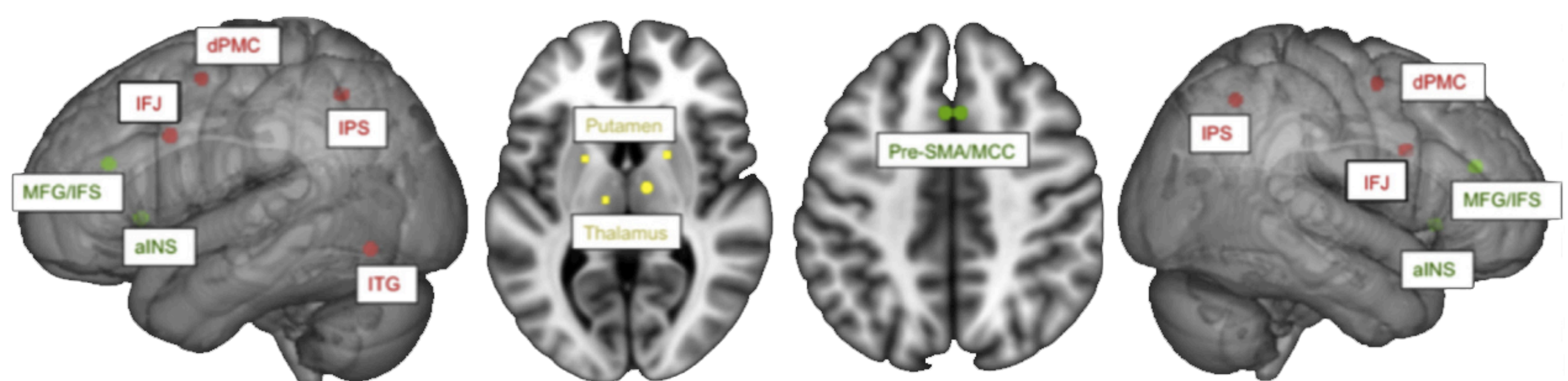
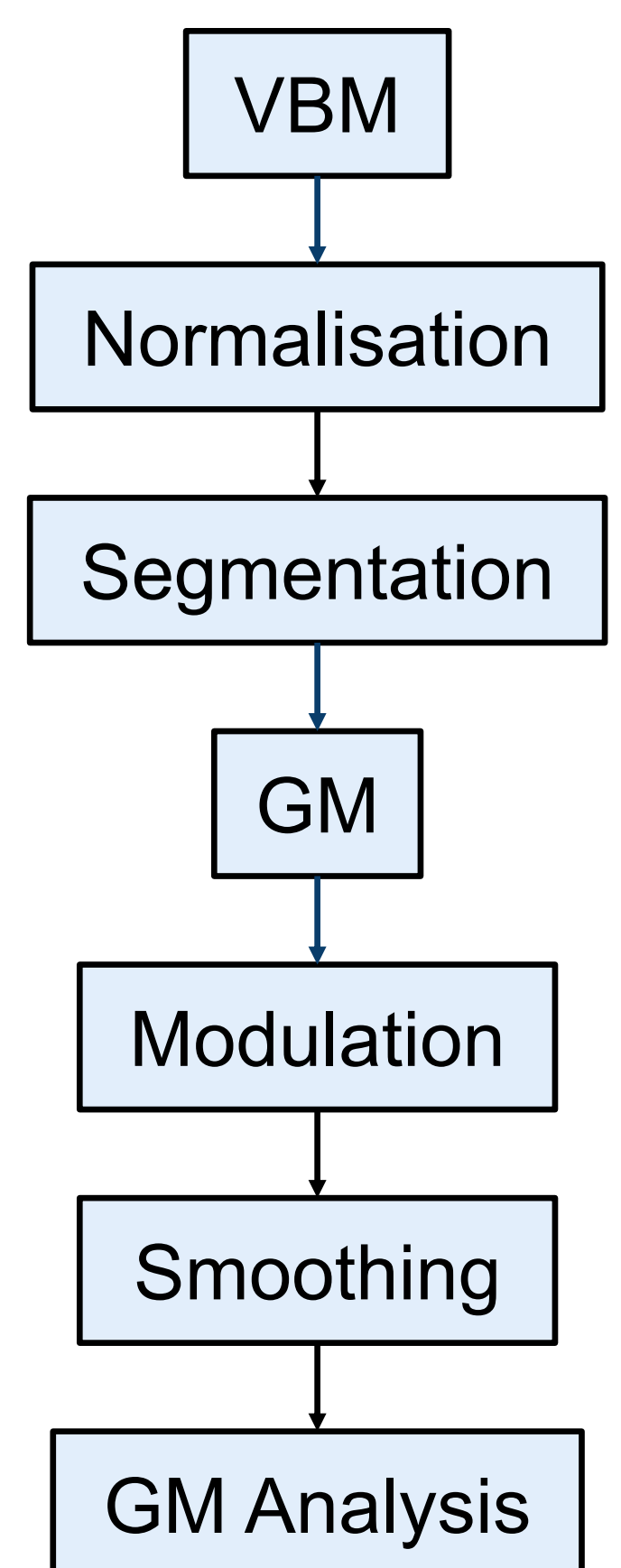
Multi-component model of working memory, adapted from Baddeley, 2000

- **Working memory (WM)**: ability to store and manipulate information for a short period of time
- Verbal and visuospatial processes associated with left and right hemisphere, respectively
- Functional correlates and involved networks well investigated
- Structural underpinnings of WM components and their lateralization unclear



Methods

- **Digit span task** and **Block tapping task** to assess verbal and visuospatial components
 - Forward and backward recall versions
- **Voxel-based morphometry (VBM)**: association of grey matter volume (GMV) and performance on both recall versions of both tasks
 - Voxel-wise whole-brain analysis
 - Regional analyses using averaged grey matter values of regions of **extended multiple demand network (eMDN)**: linked to WM but integrates further, related functions
- T1-weighted imaging data of 765 subjects from „1000BRAINS“ study (413 males | age: 55 – 76 yrs; M=65.9 ± 5,6 yrs)
- Covariates of no interest: age and gender



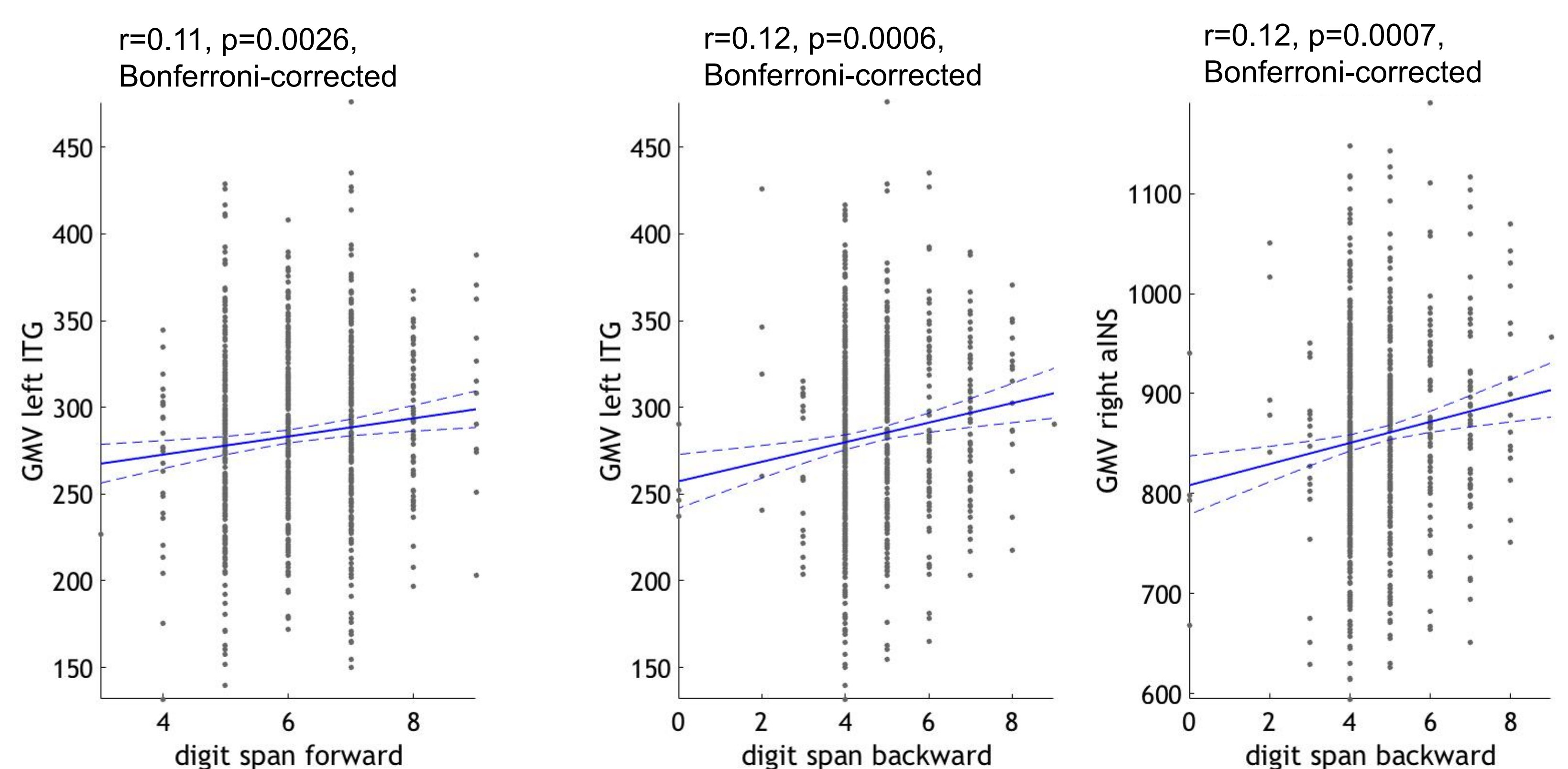
Regions of the eMDN, adapted from Camilleri et al., 2018

Results

1 Whole brain results: **No significant correlations** between GMV and performance in either recall version of either test

2 Regional results

- Digit span task
 - Forward recall positively correlated with GMV in the left inferior temporal gyrus (ITG) ($r(764)=0.11$, $p=0.0026$)
 - Backward recall positively correlated with GMV in the right anterior insula (aINS) ($r(764)=0.12$, $p=0.0007$) and left ITG ($r(764)=0.12$, $p=0.0006$)
- Block tapping task
 - **No significant correlations** between GMV in either region of the eMDN with performance on forward or backward recall



- Insula involved in executive processes
 - Significant correlation for right aINS only for the backward digit span: **more executive control** involved in backward compared to forward recall
- Left ITG linked to semantic processes and word maintenance in verbal WM
 - Confirmation of expected lateralization

- Significant correlations showed only **small effect sizes**
 - Similar to recent large sample studies using VBM
- Lack of significant results on whole-brain level:
 - **GMV might not be relevant neural substrate** when investigating WM performance or differences between the visuospatial and verbal component
 - Other factors might have stronger contribution