High resolution BOLD imaging allows for DCM that includes individual posterior fossa structures

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**Background**

- Imaging the brainstem and cerebellum is challenging with functional MRI [1]
- Partial voluming is still a problem after field map and/or physiologic correction
- Connectivity methods are very sensitive to timeseries manipulations (e.g. smoothing) [2]
- Modeling connections between cortical and subcortical structures requires precise measurements of the subcortical signal
- High in-plane resolution allows for higher SNR of individual brainstem and cerebellar nuclei

**Methods**

- 8 subjects had high-resolution (0.86 x 0.86 mm) BOLD-scans (Fig 1) while viewing optic flow [3]
- Group GLM identified V1 and MT, WFUpickatlas was used for the FNL (Fig 2)
- These ROIs were reverse-normalized using SUIT [4] and the time series extracted
- DCM of 12 models (Fig 3) was performed
- BMS identified the most likely model while t-tests showed significant connections (Fig 4)

**Results**

- V1 and MT were easily identified in the group GLM analysis
- The calculated posterior probabilities showed model 3 to be most likely with a value indistinguishable from 1.0
- T-tests of each connection in model 3 found all but 2 to be significant (Fig 4)

**Conclusion**

- High resolution fMRI allowed for DCM including cortical-subcortical connections
- The cortical topology matches previous studies using visual stimuli [2,5]
- Connections between MT and the FNL have been shown anatomically [6], but this result confirms their functional utility

**References**


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