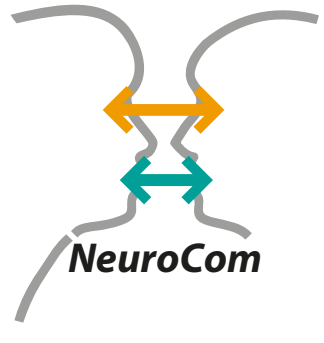


Intrinsic Functional Connectivity of the Ventral Auditory Pathway Correlates with the Acuity of Absolute Pitch

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Introduction

Absolute pitch (AP)

Spontaneous chromatic categorization of pitch even during rest

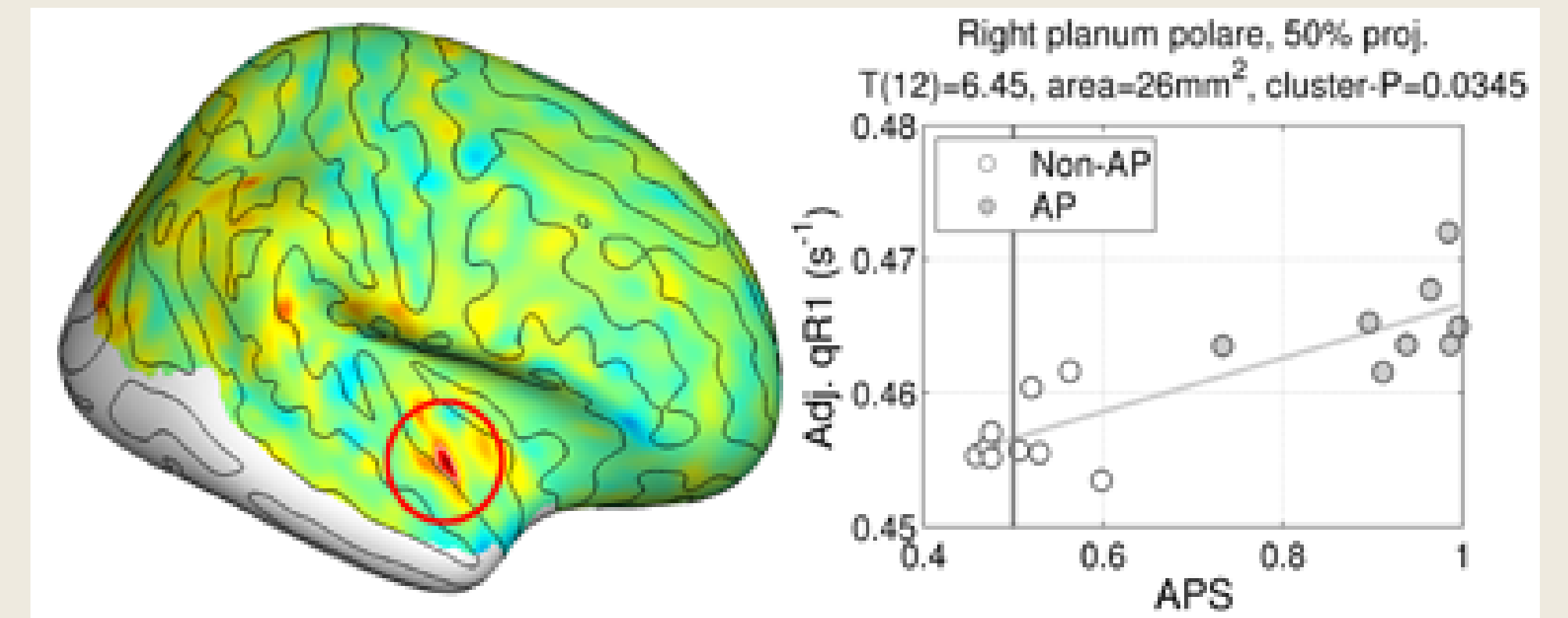
Intracortical myelination

Greater myelination found in the right planum polare (PP) for AP [Kim & Knösche, 2016]

Ventral auditory pathway

Dorsal (scene segregation) vs. ventral (object analysis) auditory pathways [Warren et al., 2003]
> *Chroma could be an object property for APs.*

Question: Is the altered cortical myelin functionally meaningful in the 'AP-network'?



[Kim & Knösche, 2016, HBM]

Methods

Participants

Seventeen musicians with (n=8) or without (n=9) AP from [Kim & Knösche, 2016] with behavioral AP score (APS)

Motion artifacts correction

Residuals from GLMs with non-neuronal regressors including 16 principal components from WM and CSF voxels ('CompCor')

Functional connectivity measures

- Pearson correlation: BPF [9, 80] mHz.
- Cross-coherence: [0, 2], [2, 4], ..., [98, 100] mHz
- Cross-correlation for ROIs

Resting-state fMRI

EPI at 3-T: 88 x 88 x 64 x (2.3 mm)³, (1.4 s) x 420

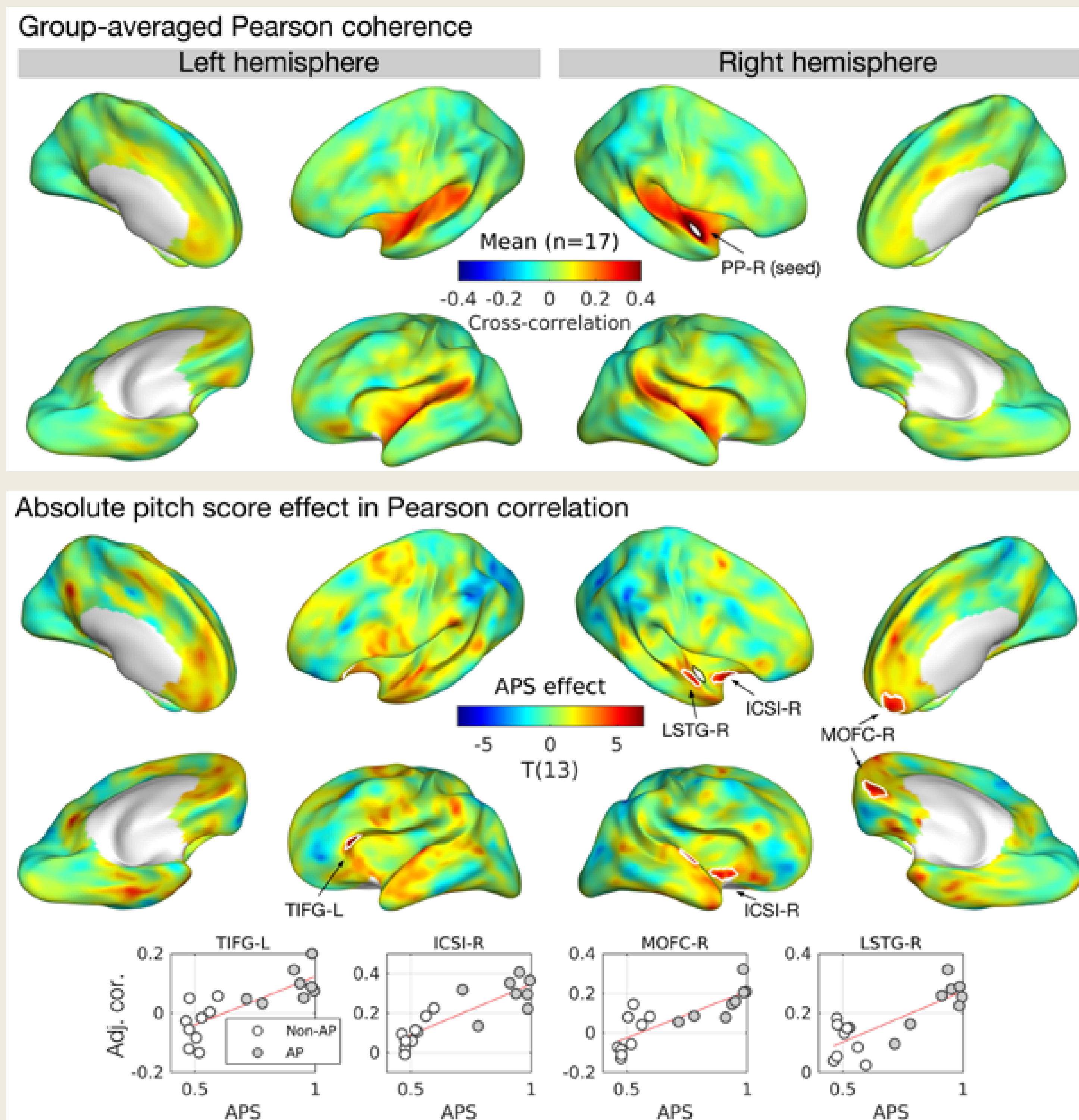
Surface-based analysis

FreeSurfer ('fsaverage5') + SurfStat (RFT-cluster)

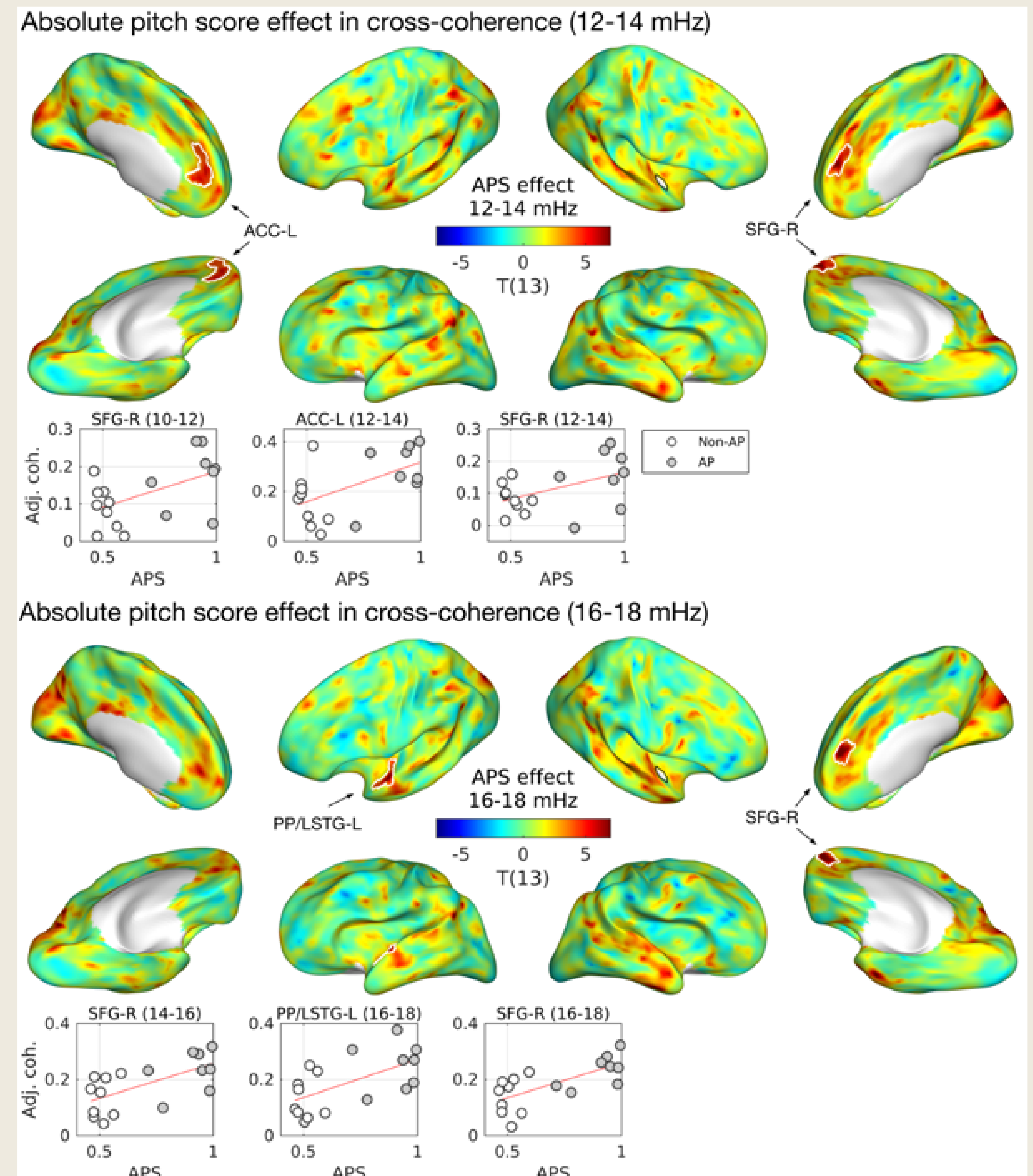
General linear model ($H_0: b_3=0$)

$$y = b_0 + \text{Motion} \cdot b_1 + \text{Ethnicity} \cdot b_2 + \text{APS} \cdot b_3 + e$$

Pearson correlation



Cross-coherence



Findings and Discussion

Ventral auditory pathway

Positive APS effect in the RSFC of PP-R in:

- Adjacent auditory cortex (LSTG-R)
- Contralateral homologous auditory regions (PP/LSTG-R)
- Ventrolateral PFC (TIFG-L)

> *Importance of PP-R in the ventral auditory pathway for AP*

Default-mode network

Positive APS effect in anterior-midline regions (ACC-L, SFG-R) that

are known as important nodes of default-mode network

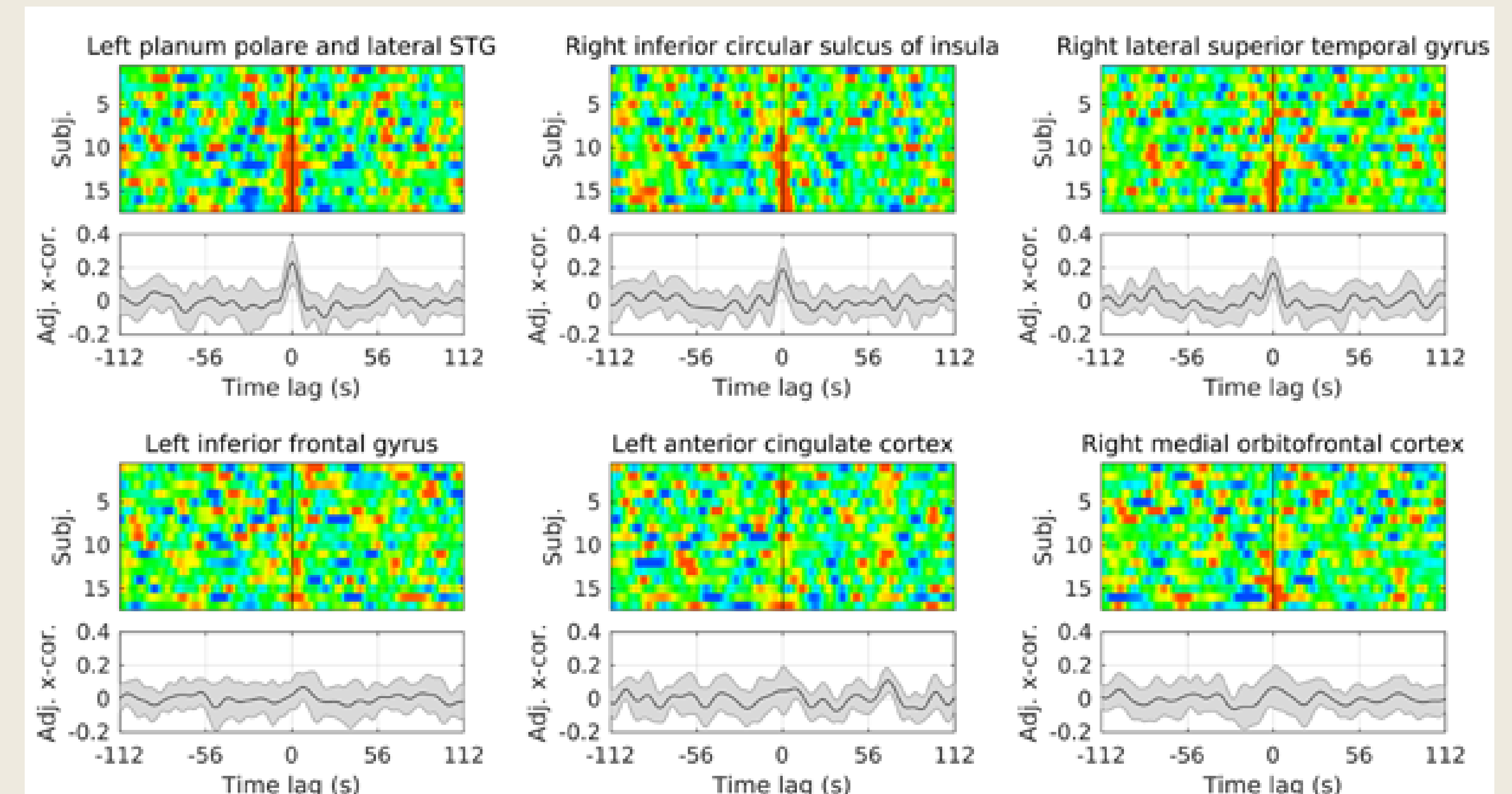
> *Reflecting the spontaneity of AP*

Time-lagged cross-correlation

- Well-aligned at zero-lag in *bilateral* auditory cortices and insula
- No such alignment found in non-auditory regions

> *High modularity of auditory cortices across all participants*

Cross-correlation (subjects sorted by APS)



For a PDF-copy with more information:



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