

Supplementary Material

Frontal theta and posterior alpha in resting EEG:

A critical examination of convergent and discriminant validity

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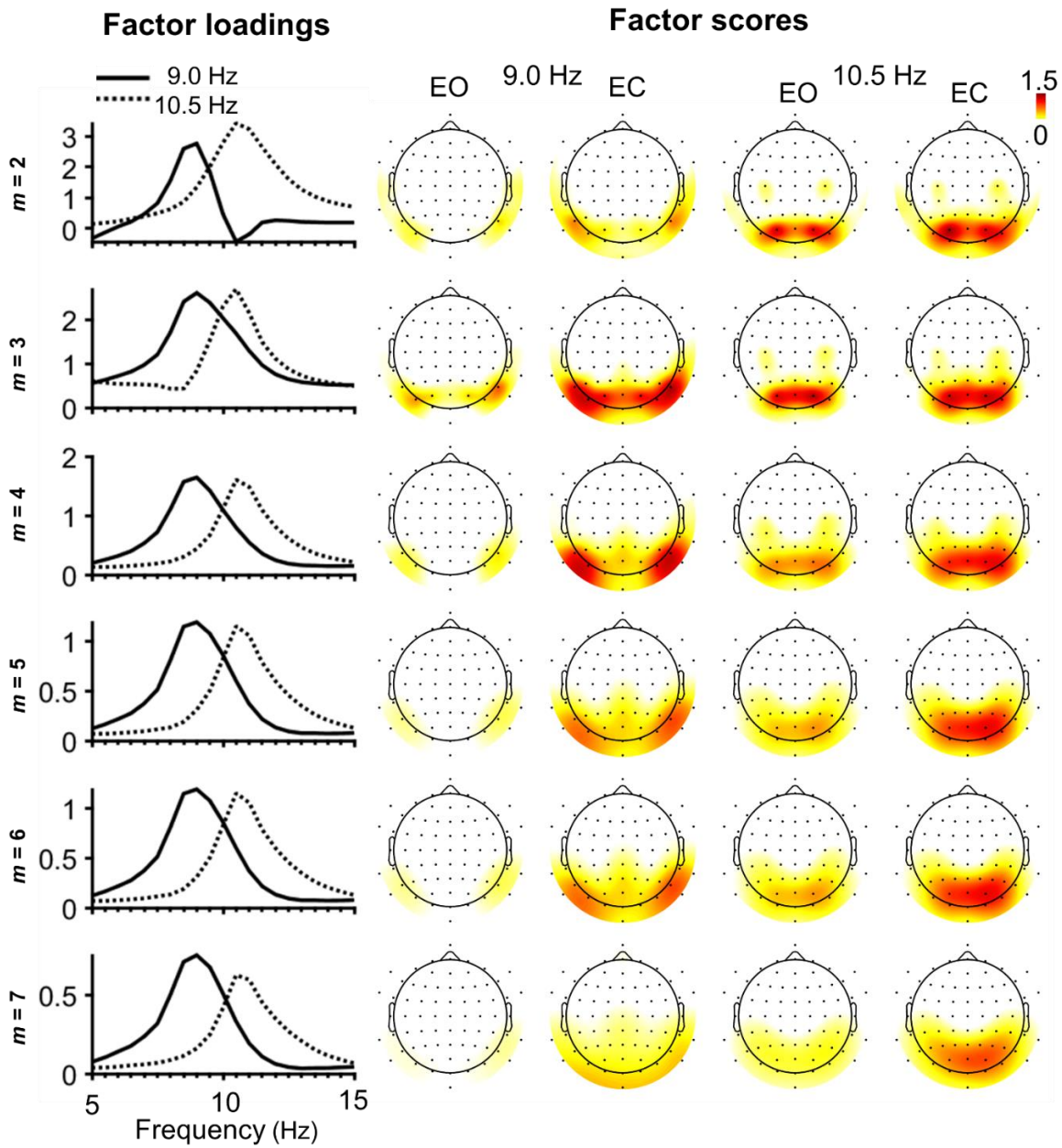


Figure S1: Consistency in alpha factor loadings (left panel) and scores (i.e. topographies; right panel) across different CSD spline flexibilities (constants m ; see Kayser & Tenke, 2015b; Tenke & Kayser, 2012). In general, factor loadings were highly comparable regardless of spline flexibility, except for the most flexible splines ($m = 2$). Tucker congruence coefficients confirmed that CSD-fPCA component loadings were highly similar for m ranging 3 to 7 (all $\phi > .90$; Lorenzo-Seva & Ten Berge, 2006). Topographies varied as expected with differences in spline flexibility (i.e., more focal with more flexible splines; Kayser & Tenke, 2015), but generally demonstrated a similar topography for the two alpha components, with 9 Hz components having lateral-occipital maxima, whereas 10.5 Hz components revealing more medial parietal-occipital maxima.

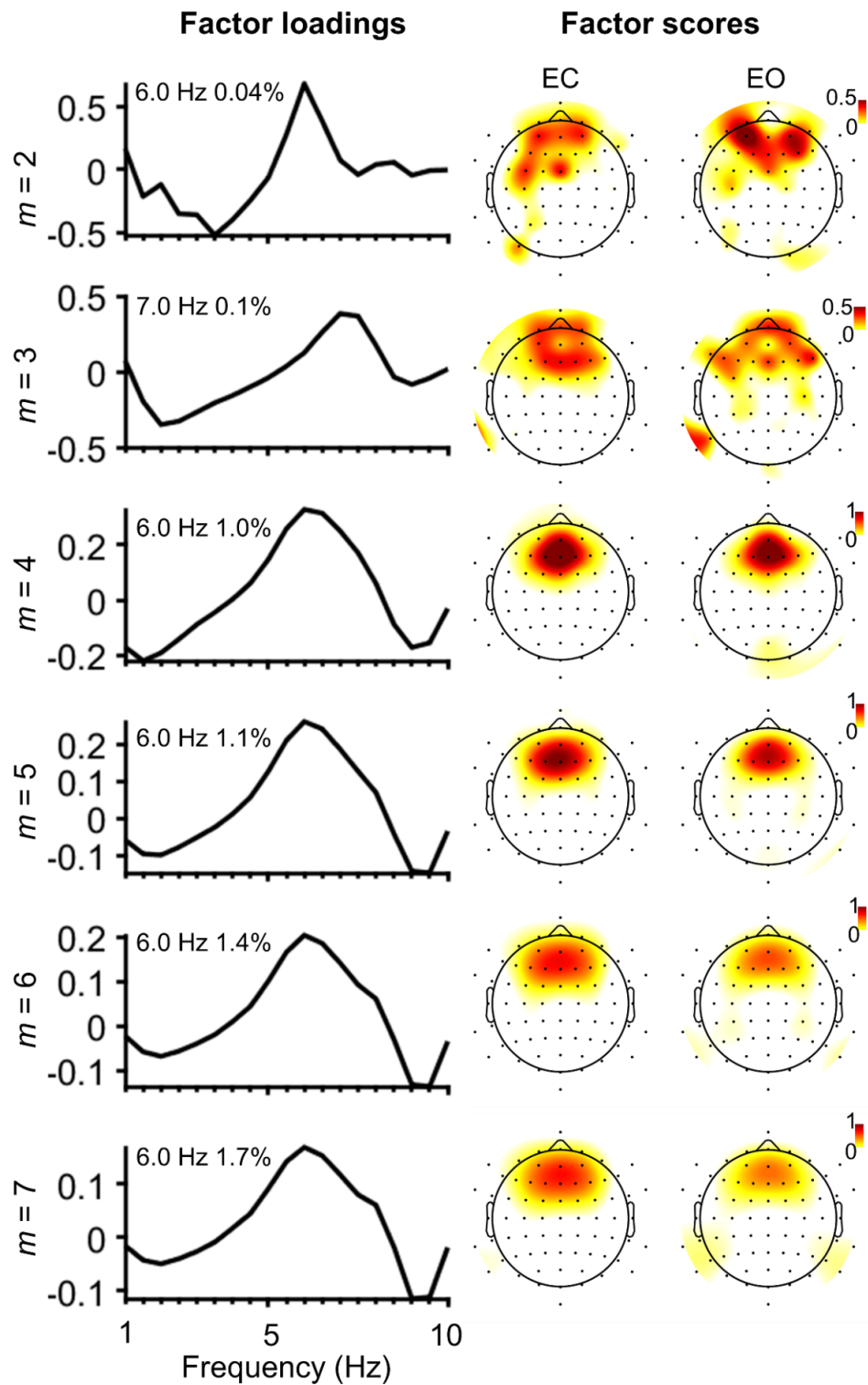
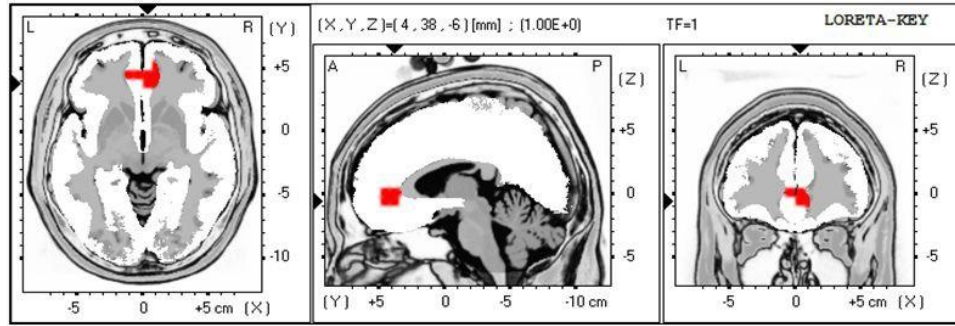


Figure S2: Consistency in theta factor loadings (left panel) and scores (topographies; right panel) across different CSD spline flexibilities ($m = 2$ to 7 ; see Figure S1). In general, component loadings were similar across different spline flexibilities. The corresponding theta topographies varied as expected with m , but generally demonstrated the typical midfrontal theta topography as described in previous work (Cavanagh & Shackman, 2015; Schacter, 1977).

LORETA w 13 voxels



eLORETA w 39 voxels @ ROI [±5 40 -5]

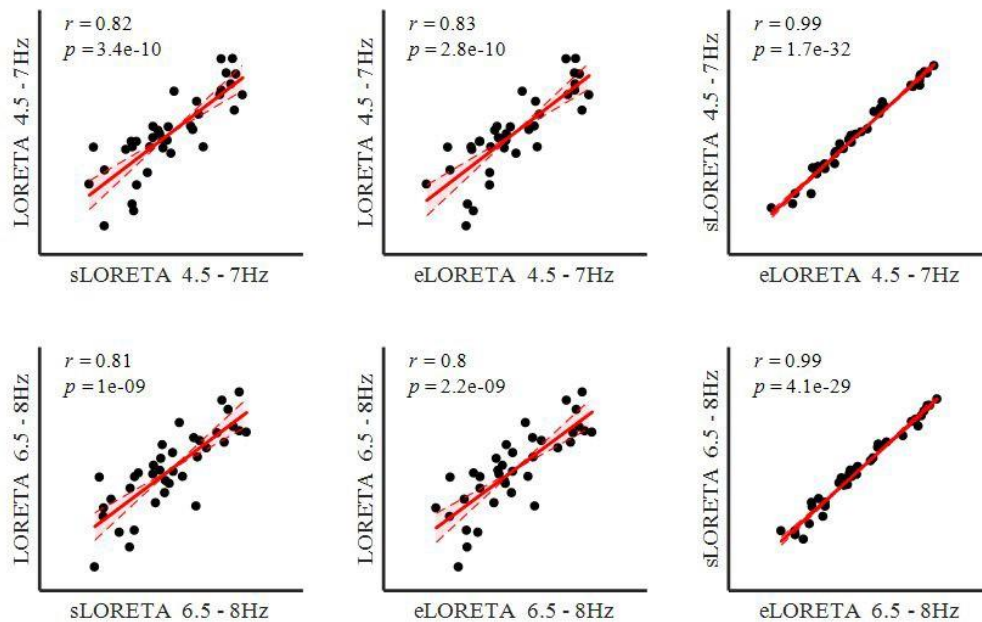
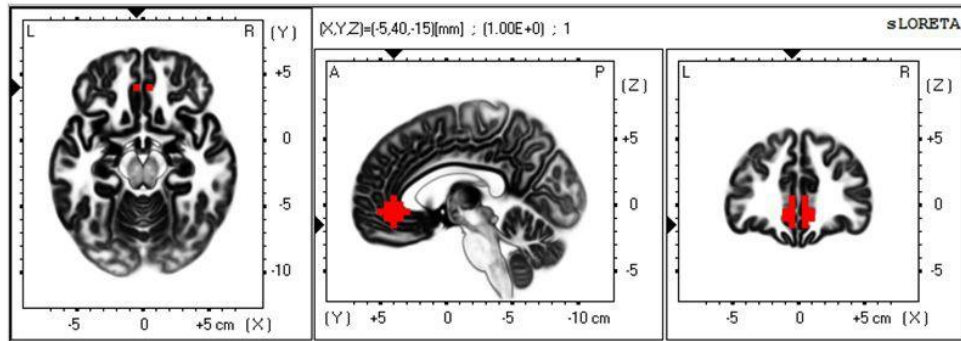


Figure S3: Similarities and differences between theta measured with LORETA, sLORETA, and eLORETA. The top two panels show the location of the rACC ROI for the original LORETA-KEY software (LORETA; 2394 voxels total) used by Pizzagalli and others (2001, 2018) and later implementations of standardized and exact LORETA (eLORETA; 6239 voxels total). The original ROI template (13 rACC voxels) was updated to the newer brain template (39 rACC voxels). Scatter plots show the correlation between different LORETA versions for a narrow theta band (6.5 to 8.0 Hz), and a more conventional theta band (4.5 to 7.0 Hz). In all cases, there was close agreement (all r s $> .8$) between different versions of LORETA, frequency band limits, and ROI.

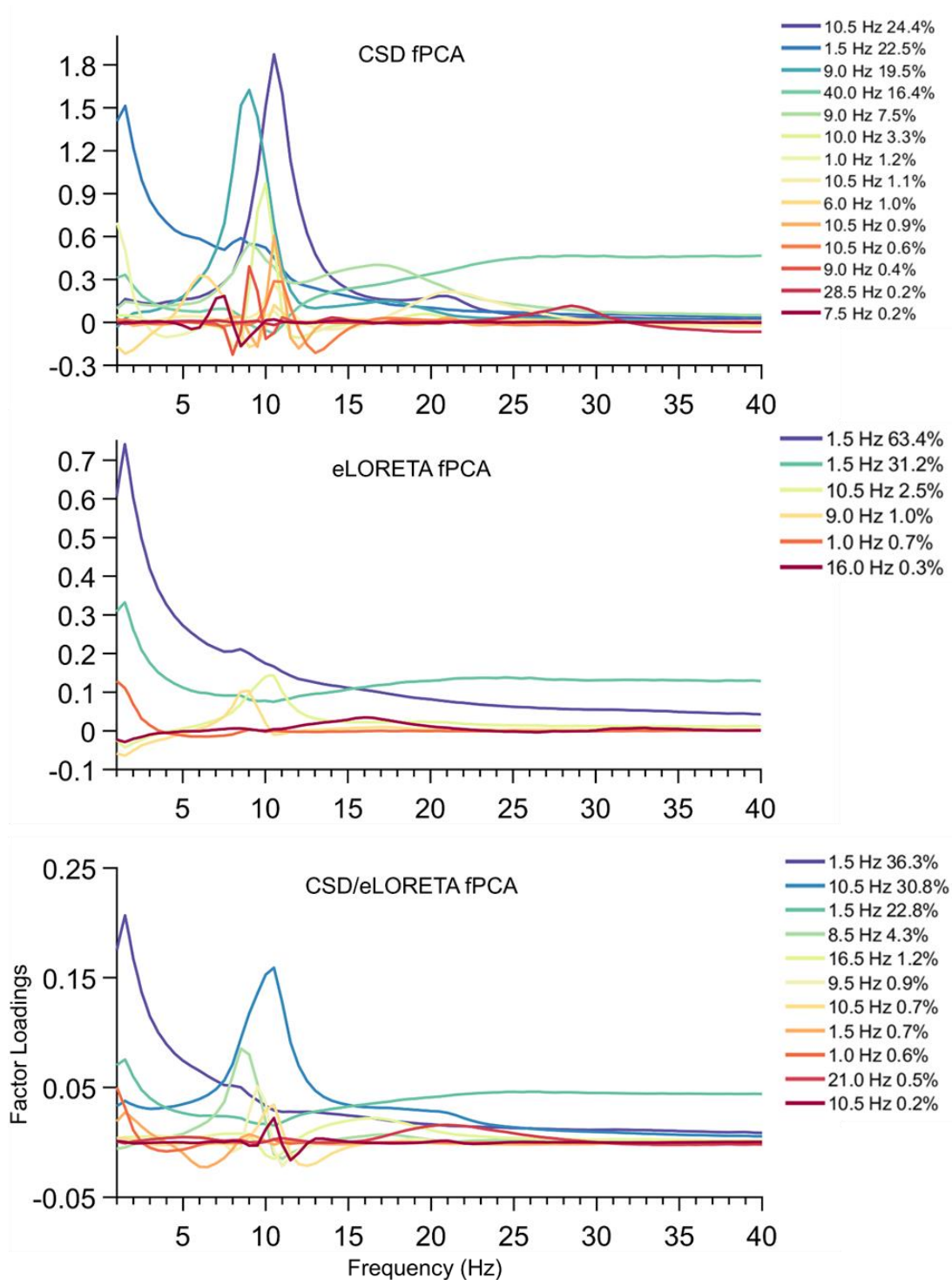


Figure S4: fPCA solutions for CSD, eLORETA, and combined CSD/eLORETA data sets, showing factor loadings that together accounted for at least 99% of spectral variance. There were two large factors with peak loadings in the alpha band (also see Figure S1) and expected topographies for each solution, but only the CSD-fPCA solution had a theta factor that contributed to the first 99% of variance. Theta components for eLORETA-fPCA and combined CSD/eLORETA-fPCA were only observed after expanding the search to 99.9% of variance. Peak frequencies of factor loadings varied slightly across solutions. Although there were other low-variance components with peak loadings in the alpha range, these components also included secondary and/or inverse loadings for other frequency ranges and were not considered further.