Supplementary Material

Frontal theta and posterior alpha in resting EEG:

A critical examination of convergent and discriminant validity

Ezra E. Smith, Craig E. Tenke, Patricia J. Deldin, Madhukar H. Trivedi,
Myrna M. Weissman, Randy P. Auerbach, Gerard E. Bruder, Diego A. Pizzagalli,
Jürgen Kayser*

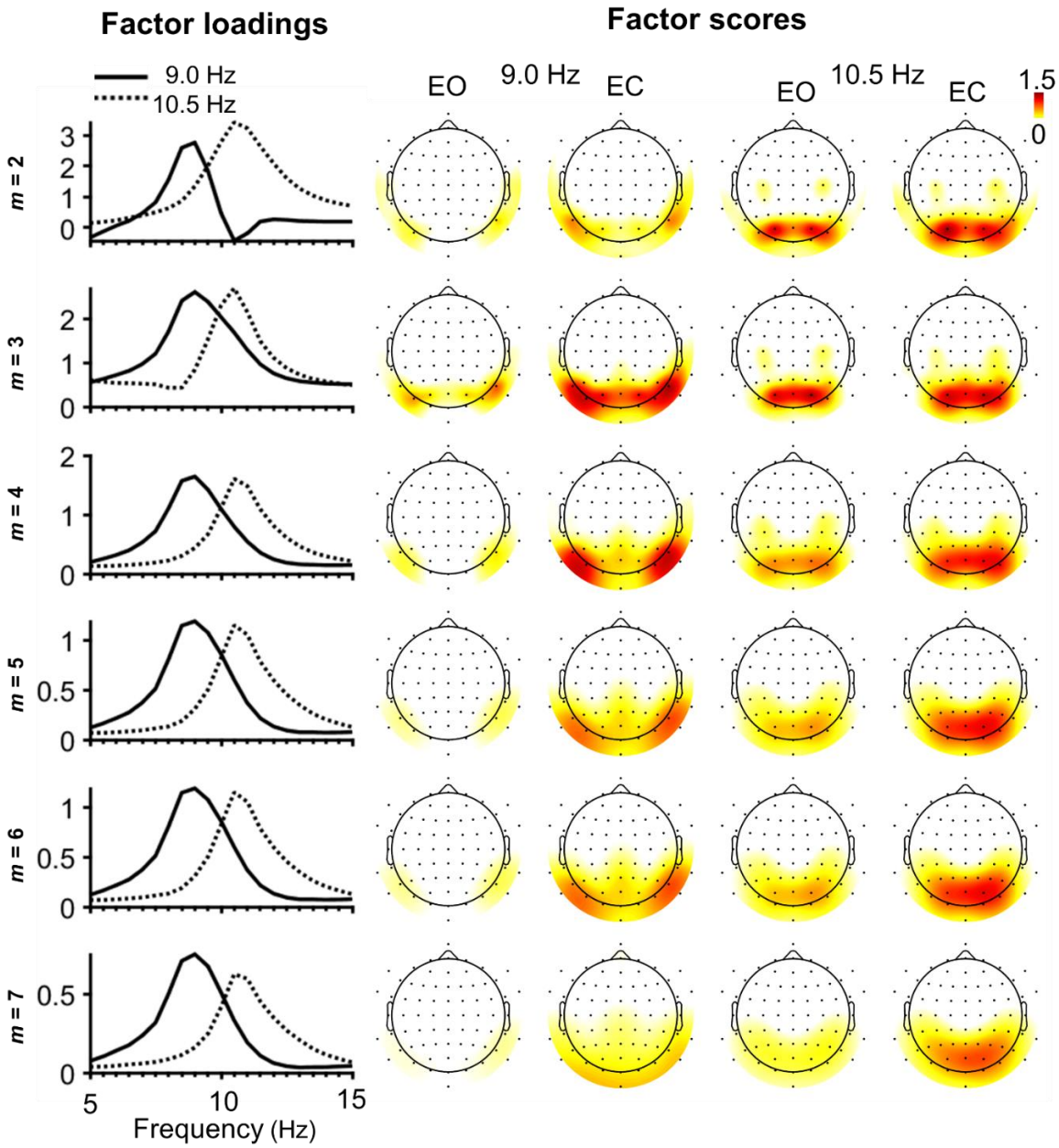

Figure S1: Consistency in alpha factor loadings (left panel) and scores (i.e. topographies; right panel) across different CSD spline flexibilities (constants *m*; see Kayser & Tenke, 2015b; Tenke & Kayser, 2012). In general, factor loadings were highly comparable regardless of spline flexibility, except 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 φ > .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.

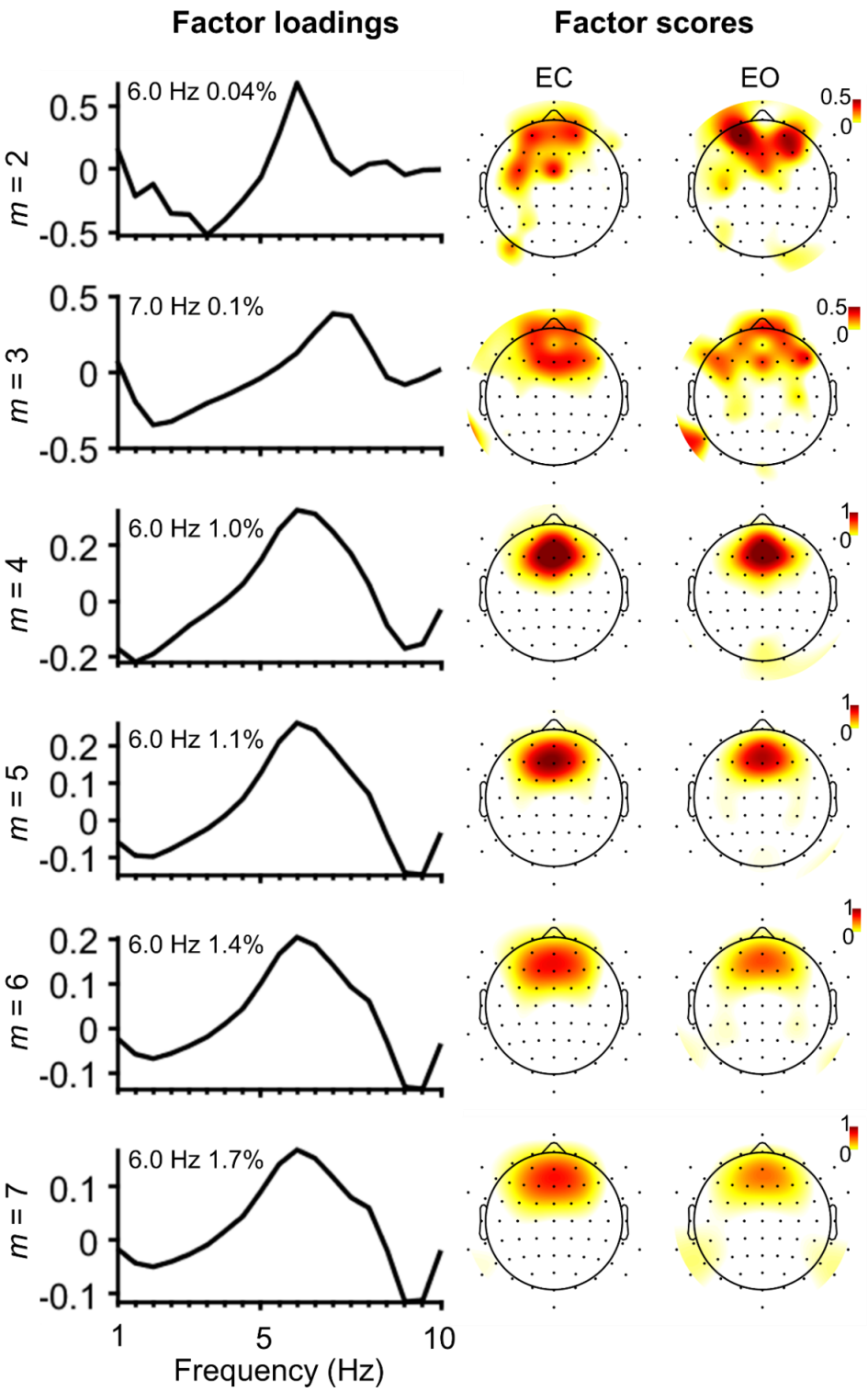

Figure S2: Consistency in theta factor loadings (left panel) and scores (topographies; right panel) across different CSD spline flexibilities (*m* = 2 to 7; see Figure S1). In general, component loadings were similar across different spline flexibilities. The corresponding theta topographies varied as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

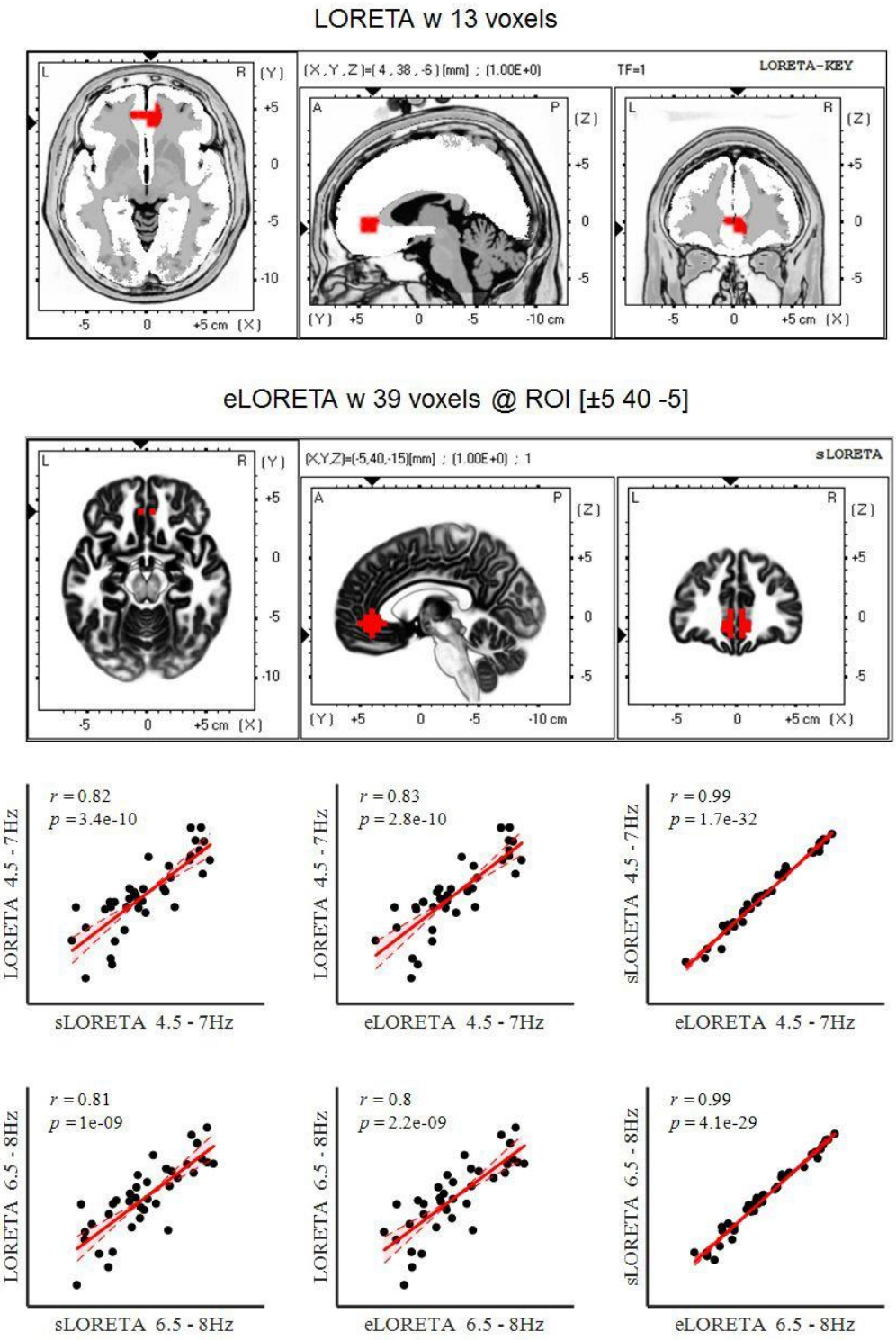

Figure S3: Similarities and differences between theta measured with LORETA, sLORETA, and eLORETA. The top two panels show the location of the rACC ROI for the original LORETA-KEY software (LORETA; 2394 voxels total) used by Pizzagalli and others (2001, 2018) and later implementations of standardized 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 rs > .8) between different versions of LORETA, frequency band limits, and ROI.

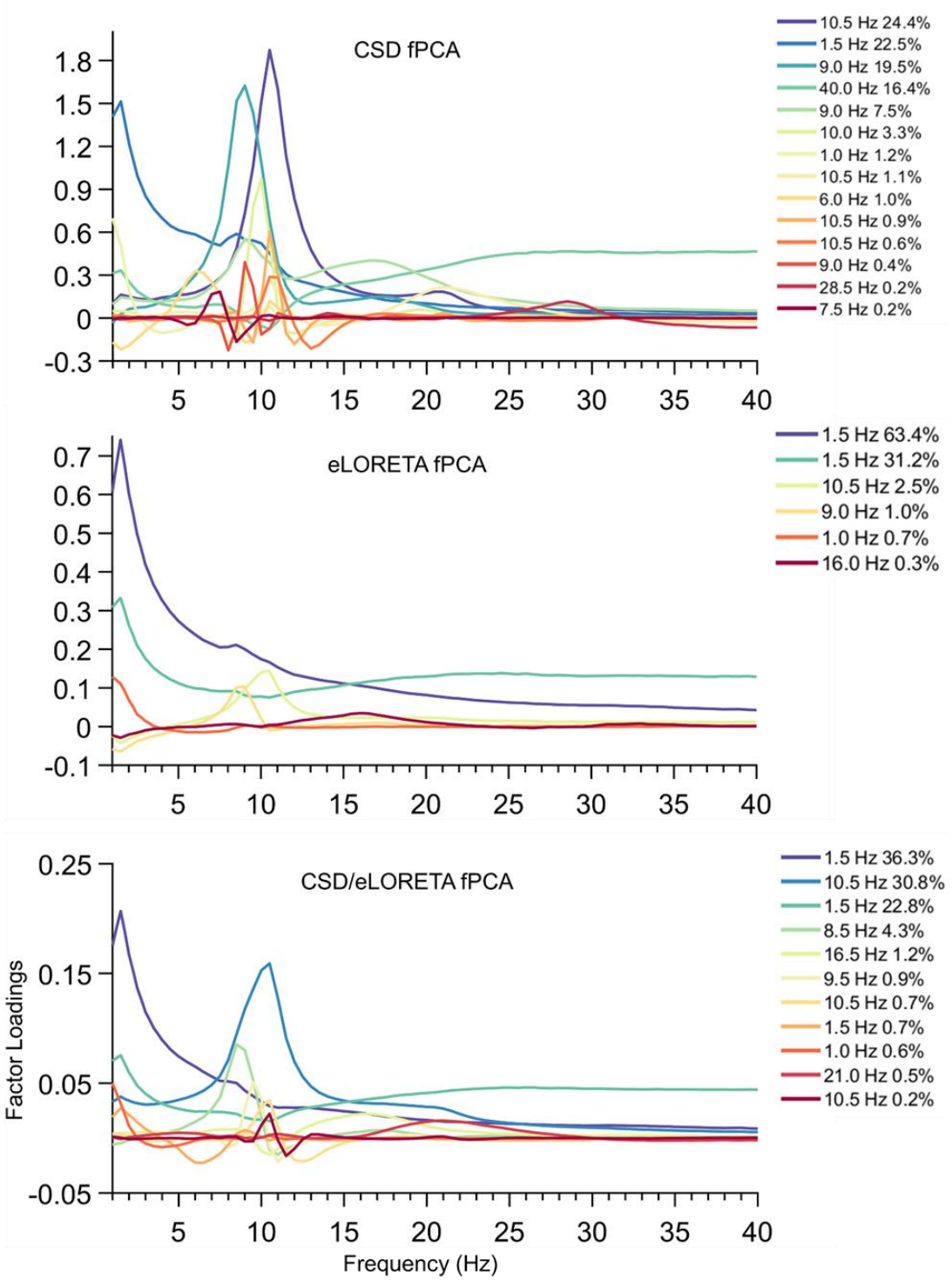

Figure S4: fPCA solutions for CSD, eLORETA, and combined CSD/eLORETA data sets, showing factor loadings that together accounted for at least 99% of spectral variance. There were two large factors with peak loadings in the alpha band (also see Figure S1) and expected topographies for each solution, but 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.