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**Resting state brain activity predicts individuals' conformity.**

**AUTHOR BLOCK:** A. OSSADTCHI<sup>1</sup>, A. SHESTAKOVA<sup>1,2</sup>, I. ZUBAREV<sup>1</sup>, \*V. KLUCHAREV<sup>3,1</sup>;

<sup>1</sup>St. Petersburg State Univ., Saint Petersburg, Russian Federation; <sup>2</sup>MEG Ctr., Moscow State Univ. of Psychology and Educ., Moscow, Russian Federation; <sup>3</sup>Univ. of Basel, Basel, Switzerland

*Abstract:*

Objective

Conformity is the tendency of people to alter their behavior as a result of group pressure. We report here on a magnetoencephalographic (MEG) study probing the hypothesis that resting state neural activity at the frontal cortex could predict individual differences in social conformity.

Material and Methods

To test these hypotheses, we used a paradigm in which a person's initial judgments, that is trustworthiness ratings of faces, were open to the social influence by the opinion of a group (Klucharev et al., 2009). Nineteen female participants rated the trustworthiness of female faces and after each rating they were informed about an 'average group rating' of the face. To detect subsequent conformity with the group, participants rated the same set of faces again but without the normative (group) ratings. For each subject we calculated a *conformity score* indicating the individual level of conformity. Eyes-open resting state brain activity was recorded for 5 minutes with Neuromag 306 Vectorview system at a sampling rate of 1000 Hz. The MEG data were preprocessed using Elekta-Neuromag Max-filter to compensate for head movements, to recalculate the data to the standard head origin and for ocular artifact removal.

For each MEG sensor we estimated power spectral density using Welch method (2 sec. Hanning windows with 50% overlap). For each subject and for each sensor we calculated average power values over Theta 4-7 Hz, Alpha 8-12 Hz, Beta 15-50 Hz and Gamma 25-50 Hz bands. Finally, we conducted a regression analysis using average band power values to predict the individual level of conformity (conformity score). We performed randomization test and corrected for multiple comparisons using the FDR = 0.1 and  $p < 0.05$ .

Results

We have found that theta and gamma band power activity registered with gradiometers over the left frontoparietal regions was significantly correlated with conformity score of subjects ( $p < 0.01$ , FDR = 0.15). All of significant correlation coefficients had positive sign and range between 0.4-0.6. Additionally, there was no sensors where alpha and beta band activity exhibited even marginally significant correlation ( $p < 0.1$ ) with the individual's conformity score. In the follow-up analysis we will use subject specific inverse solvers for estimating the sources of the effects in the alpha and beta bands.

**Conclusions:**

Our results further support the hypothesis that social conformity is based on a general performance monitoring mechanism. In particular, the reported results illustrate the predictive value of the frontal resting state theta activity that was previously implicated into behavioral adaptations during performance monitoring.

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