Resting state functional magnetic resonance imaging (fMRI) in people with aphasia (PWA)

V. Zavyalova¹,³, O. Dragoy¹, S. Kuptsova¹,², N. Canessa⁴, A. Petrushevsky², O. Fedina², S. Cappa⁴

¹ National Research University Higher School of Economics, ² Center for Speech Pathology and Neurorehabilitation, ³ National Research Centre ‘Kurchatov Institute’, ⁴ University of Pavia

**Background**: The role of language networks reorganization in aphasia has not been clarified yet. The aim of this study was to investigate differences in resting state language networks in people with aphasia and non-brain-damaged individuals.

**Methods**: 32 people with aphasia due to a stroke in the left hemisphere and 32 healthy age-matched individuals participated in the resting state fMRI study. Data preprocessing was performed in SPM8. We identified resting state networks using group independent component analysis in GIFT. We used univariate tests corrected for multiple comparisons between people with aphasia and non-brain-damaged individuals (Allen et al., 2011). To establish the direction of the group effect, using SPM8.

**Results**: The effect of group (after univariate tests in GIFT) was only found significant in two language networks: the left frontal network (LFN), which mostly involved the lateral portion of the left frontal lobe from the inferior gyrus to primary motor cortex, and the bilateral temporal network (BTN), encompassing superior and middle temporal gyri bilaterally. The LFN and the left part of the BTN displayed stronger intensity of spontaneous activity in healthy individuals, while the right part of the BTN was more strongly activated in people with aphasia.

**Conclusions**: The left-lateralized frontal and temporal components of these networks were more strongly activated in healthy people, in contrast to the right temporal component, which was more strongly recruited in people with aphasia. More intense engagement of the right hemisphere language-related homologues under the condition of a left-hemisphere damage might underlie this asymmetry (Saur, 2006).