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## Default mode network and Language-related resting state functional connectivity on handedness and family history

Evaluation of brain function by resting state fMRI is expected to be one of the convenient applications to help diagnosis of mental disorders, such as depression and Alzheimer disease (AD). Especially, it is considered that functional connectivity of the default mode network (DMN) would reflect brain function of self-recognition as a biomarker at a preclinical stage of AD. Further, the cerebral function of language is an important aspect for the evaluation of brain dysfunction in mental disorders, eg., epilepsy. To develop useful clinical applications, examining the influence of handedness shows promise, but to our knowledge, there have been few studies on whether these networks influence the difference in handedness. We aimed to investigate the functional connectivity of DMN and language-related area (LRA) by resting state fMRI. Further, we evaluated whether these DMN-language networks influenced handedness. In the functional connectivity analysis of the 101 subjects, the main effect of handedness was significantly observed at the posterior cingulate from bilateral supplemental motor cortices, and the anterior cingulate from the posterior cingulate. Further, the main effect of non-right-handed family history was significantly observed at the right inferior parietal cortices projected from bilateral supplemental motor areas ($p<0.05$, uncorrected; FDR $p<0.05$). As for LRA, in right-handed subjects, a region of strong positive correlation with the right amygdala was observed at the thalamus, middle frontal gyrus/anterior cingulate, cerebellum, and globus pallidus. On the other hand, in non-right-handed subjects, the region of strong negative correlation with the right amygdala was observed at the bilateral inferiolateral occipital cortex, posterior cingulate, medial frontal gyrus/anterior cingulate, superior frontal gyrus, and supplemental motor cortex ($p<0.05$, uncorrected; FDR $p<0.25$). We could find different functional connectivities by differences of handedness or differences of non-right-handed family history. These results may suggest the influence of handedness or non-right-handed family history when evaluating functional connectivity on mental disorders.

### Biography

Michihiko Koeda is a senior assistant professor of the psychiatry department at Nippon Medical School, Tokyo, Japan. He completed his PhD at the Medical Research Institute of Tokyo Medical and Dental University. He was a visiting researcher at the University of Glasgow. He is continuing to investigate auditory brain function by the use of functional MRI to clarify the pathophysiology of psychiatric symptoms, and pharmacological and/or genetic effects.

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