



# The presupplementary area within the language network: a resting state functional magnetic resonance imaging functional connectivity analysis

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The presupplementary motor area (pre-SMA) is involved in volitional selection. Despite the lateralization of the language network and different functions for both pre-SMA, few studies have reported the lateralization of pre-SMA activity and very little is known about the possible lateralization of pre-SMA connectivity. Via functional connectivity analysis, we sought to understand how the language network may be connected to other intrinsic connectivity networks (ICNs) through the pre-SMA. We performed a spatial independent component analysis of resting state functional magnetic resonance imaging in 30 volunteers to identify the language network. Subsequently, we applied seed-to-voxel functional connectivity analyses centered on peaks detected in the pre-SMA. Three signal peaks were detected in the pre-SMA. The left rostral pre-SMA intrinsic connectivity network (LR ICN) was left lateralized in contrast to bilateral ICNs associated to right pre-SMA peaks. The LR ICN was anticorrelated with the dorsal attention network and the right caudal pre-SMA ICN (RC ICN) anticorrelated with the default mode network. These two ICNs overlapped minimally. In contrast, the right rostral ICN overlapped the LR ICN. Both right ICNs overlapped in the ventral attention network (vATT). The bilateral connectivity of the right rostral pre-SMA may allow right hemispheric recruitment to process semantic ambiguities. Overlap between the right pre-SMA ICNs in vATT may contribute to internal thought to external environment reorientation. Distinct ICNs connected to areas involved in lexico-syntactic selection and phonology converge in the pre-SMA, which may constitute the resolution space of competing condition-action associations for speech production.

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