Brain in Rest vs. Brain in Action: Neuroimaging for Neuroaesthetics

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Artistic training is a complex learning that requires the meticulous orchestration of sophisticated polysensory, motor, cognitive, and emotional elements of mental capacity to harvest an aesthetic creation. In this study, we investigated the architecture of the resting-state functional connectivity networks from professional painters, dancers and pianists. Using a graph-based network analysis, we focused on the art-related changes of modular organization and functional hubs in the resting-state functional connectivity network. We report that the brain architecture of artists consists of a hierarchical modular organization where art-unique and artistic form-specific brain states collectively mirror the mind states of virtuosos. We show that even in the resting state, this type of extraordinary and long-lasting training can macroscopically imprint a neural network system of spontaneous activity in which the related brain regions become functionally and topologically modularized in both domain-general and domain-specific manners. The attuned modularity reflects a resilient plasticity nurtured by long-term experience.