

# The Touch of Sight: Inter-Subject Correlation Unveils crossmodal Convergence in the human brain

*Saturday, September 13, 2025 11:20 AM (10 minutes)*

Feeling a touch is different from observing a touch. However, previous observations suggest shared neural representations between the two sensory modalities. To clarify this phenomenon, in this fMRI study, we employed inter-subject correlation (ISC) analysis, a measure of brain synchronization across individuals, between two groups of participants exposed either to a continuous passive tactile stimulation of their hands employing a brush, or to a naturalistic visual movie of an identical tactile stimulation.

ISC analysis was performed computing Pearson's correlation coefficient between the BOLD activity elicited in the Real-Touch and in the Visual-Touch subjects. Subsequently, in the significant ROIs, we tested the correlation's drop when introducing mismatched information related to lateralization and digitotopy. Statistical significance was assessed through a permutation test and FDR correction for multiple comparisons.

ISC between individuals exposed to Real-Touch or Visual-Touch isolated brain regions responding to both visual and tactile stimuli: a significant synchronization was found in several brain areas. Among them, significant results were found in S1 and S2 and in the middle temporal area. Subsequently, we found a significant reduction in ISC while introducing mismatching information.

Our results demonstrated a direct contribution of the somatosensory cortices in building a shared neural representation between real and observed touch, identifying a multimodal representation of the hands that is sensitive to bodily information in the human brain. This would open the way for future investigations of heteromodal remapping of visual input in somatosensory cortices, following permanent sensory deprivations, as in upper limbs agenesis or amputation.

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