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Talk Title:

Neural representations of subjective tactile feelings for texture surfaces of common materials

Abstract:

Tactile exploration of surface textures helps us understand material properties and obtain subjective tactile feelings. While psychological research has extensively studied texture perception concerning typical tactile attributes like “hardness” and “roughness” using a wide range of surface textures, studies investigating the neural mechanisms underlying human tactile texture perception, particularly with neuroimaging techniques, have primarily focused on artificial textures such as embossed dot patterns and gratings or limited sets of naturalistic textures. Consequently, the neural representations of tactile texture perception associated with subjective tactile feelings in natural environments remain unexplored. To fill this gap, we investigated the relationship between brain activity and subjective tactile experiences using functional magnetic resonance imaging (fMRI) and various tactile textures consisting of common materials, which were annotated with ratings of tactile attributes. In the experiment, fMRI activity was measured while subjects repeatedly stroked the surface of the texture stimuli. Multivoxel pattern analysis revealed that differences in a rich set of tactile textures can be detected through fMRI responses elicited by touch and that distinct brain areas represent different aspects of subjective tactile feelings. These findings provide a foundation for further investigations into the neural underpinnings of human tactile perception.

Biographical information:

2011: Ph.D. in Information Science and Technology from The University of Tokyo.

2011-present: Researcher in NTT Communication Science Laboratories.