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Presentation Abstract

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Title:	Neural representation of motion signal after direction remapping in touch: Evidence from motion aftereffect
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Abstract:	The brain must realign information of tactile position and direction from the primary somatosensory maps to external coordinates in order to perceive the world appropriately. Although recent studies revealed sites of neural representations underlying remapping of positional information, a demonstration of neural representation for direction remapping was lacking. Here we psychophysically investigate whether the neural representation for direction remapping exists in the human tactile system using motion adaptation paradigm. We employed finger crossed posture to manipulate the relative spatial and somatotopic relations between fingers and compared the aftereffects of the inter-finger motions between normal and finger crossed posture. In normal posture, after adapting to a lateral motion between index and middle fingers, perceived motion direction was biased to the opposite direction to the adapted direction. In finger crossed posture, after adapting to the motion with the finger crossed, the posture was changed to normal one and test stimulus was presented. If the neural representation for direction remapping does not exist, the motion aftereffects could be observed in the somatotopic map, regardless of the postures. However, our results showed that the motion aftereffect was dominantly observed in the external coordinate, namely the perceived direction after adaptation is the same as the adapted direction in the somatotopic map. These findings firstly demonstrate the existence of neural representation

for remapped motion direction, and in addition, imply that tactile motion processing is dominantly performed using the remapped representation rather than somatotopic one. In order to investigate the relationship between the remapped representation and tactile conscious experience in motion processing, we conducted another experiment, in which participants placed their left index finger next to the finger crossed right hand. The motion stimulus was presented from right middle finger to the right and left index fingers simultaneously, and vice versa to give a confusing motion direction. Although the same motion stimuli used in the previous experiment were presented to the right hand, the motion aftereffect was not observed in this condition, demonstrating the dominance of remapped representation again, and close relationship between the remapped representation and tactile conscious experience.

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