
Distinction of self-touch and other-touch occurs in the spinal cord

Reinoud Kaldewaij , Adam Enmalm , Robin Kämpe , Paula Salamone , Juergen Finsterbusch , Alexandra Tinnermann , Håkan Olausson , and Rebecca Boehme*¹

¹Linköping University – Sweden

Abstract

Through touch we can perceive the physical border between our own body and the outside world. The distinct experiences of ‘being touched’ and ‘touching oneself’ are reflected in primary sensory brain areas, but also regions associated with social cognition and interoception. Early electrophysiological evidence suggests that self-vs-other touch is differentially processed at the level of the spinal cord, but the exact mechanisms are not yet understood. During simultaneous functional MRI of the brain and spinal cord, participants touched their own left forearm, or an object, or were touched by an experimenter. Touching consisted of slow and gentle stroking typical for real-life social touch. Two fields of view for the spinal cord were investigated: cervical level 5-7 (sample 1) and cervical level 4.5-6.5 (sample 2).

Brain activation patterns for self/other/object-touch replicated previous findings. In sample 1, two clusters of differential activation in the spinal cord for self/other/object-touch reflected sensory and motor processing of the touching hand. In sample 2, an additional spinal cord activation cluster reflected attenuated processing for self- vs. other touch on the left forearm. Spinal cord showed activation differences related to efferent right-hand motor signalling and afferent right-hand and left-forearm sensory signalling. Importantly, processing of self-produced touch on the forearm appeared to be attenuated compared to social touch from others. This indicates that self-vs-other-touch is already differentially processed at the level of the spinal cord.

Keywords: social touch, self, other, distinction, spinal cord, fMRI

*Speaker