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# Haptic sensorimotor strategies of exploration of daily surfaces

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## Abstract

Humans use stereotyped haptic strategies of exploration to interact with objects. For example, to detect the shape of an object we follow its contours, to detect its temperature we apply a light contact to it, etc. These sensorimotor strategies may play an essential role in perception, e.g. by potentiating the response of specific types of skin receptors among others to improve the percept quality. In the present study, our aim was to explore if similarly-stereotyped strategies exist in the context of surface exploration, in particular when the exploration is executed with specific intentions (e.g. evaluate the stickiness). 19 participants were instructed to freely explore 18 daily surfaces (e.g. sandpaper, leather chamois) with the index fingerpad and to rate them according to the four main dimensions of touch (roughness, stickiness, hardness, and pleasantness). Numerous recordings were made to support the description of the sensorimotor strategies evaluating physical (force, acceleration, position), physiological (electromyography, EMG) and emotional (facial EMG) components. Preliminary results revealed that the texture qualities were adequately recognized (e.g. the stickiest textures are rated as such), and that specific movement features may exist to enable recognition of the initial intention using for example machine learning. Future analyses may include such type of computational methods to reveal whether humans do use specific strategies as a function of their touch intention. The knowledge gained will help us designing future ecological microneurography studies mimicking the natural strategies and will guide us in developing technologies that aim at enhancing touch in virtual environments.

**Keywords:** active touch, texture coding, haptic exploratory procedures, virtual touch

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