学位論文の要旨

Abstract of Thesis

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学位論文題目 Title of Thesis（学位論文題目が英語の場合は和訳を付記）

Psychophysical Studies on the Perception of Human Affective Touch across Skin Sites

（身体部位における情動的触覚の知覚特性に関する心理物理学的研究）

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Touch sensations are transmitted by different combinations of mechanoreceptors. The experience of touch leads to sensations that involve both discriminative and emotional aspects. According to these theories, the experiences of touch are mediated by two separable dimensions, classified as sensory-discriminative and motivational-affective. Although much more is known about the perception of discriminative touch, such as roughness, shape and vibration discrimination, little is known about affective touch, which plays a critically important role in interpersonal communication. Therefore, the aim of the present study is to clarify how physical factors and contextual information affect the perception of affective touch and how the perception of affective touch differs across human skin.

Firstly, to investigate how stroking area affects the perception of affective touch between the glabrous skin of the palm and the hairy skin of the forearm. We used two different hardness of brushes to stroke the glabrous skin of the palm and the hairy skin of the forearm. Meanwhile, a series of plastic films with different areas of windows exposed the skin to the moving brush and assured maintenance of a different spatial relationship between the brush and the body part. In addition, stimuli were delivered successively on the palm and arm (or arm and palm) in different days to eliminate the influence of the order of stimulus presentation. The current study suggests that stroking area within a certain range have an effect on the perception of affective touch and the stimulus is perceived to be more intense as the area of stimulation increases.

Secondly, to investigate how stroking hardness affects the perception of affective touch. Affective tactile stimulation was given with four different hardness of brushes at three different forces, which were presented to either palm or forearm. To quantify the physical factors of the stimuli (brush hardness), ten naïve, healthy participants assessed brush hardness

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using a seven-point scale. Based on these ten participants, five more participants were added to rate the hedonic value of brush stroking using a visual analogue scale (VAS). The current study suggests that pleasantness ratings over the skin resulted in a preference for light, soft stroking, which was rated as more pleasant when compared to heavy, hard stroking and show that the hairy skin of the forearm is more susceptible to stroking hardness than the glabrous of the palm in terms of the perception of pleasantness. These findings of the current study extend the growing literature related to the effect of stroking characteristics on pleasantness ratings.

Thirdly, to investigate the effects of visual contexts (facial expressions, scenes) with different visual types (unpleasant, neutral, pleasant) on affective touch pleasantness across different skin sites. Ten naïve, healthy participants selected 60 facial expression images (20 unpleasant, 20 neutral, 20 pleasant images) and 60 scene images (20 unpleasant, 20 neutral, 20 pleasant images) using a seven-point scale. Then, fifteen healthy participants rated tactile pleasantness on a visual analogue scale (VAS) when they were stroked with a soft brush at three stroking forces on the palm or forearm accompanied by viewing facial expression or scene images. The current study replicates and extends the findings regarding the influences of visual context on the perception of affective touch and highlights the same effects of visual context on the tactile pleasantness ratings from the glabrous skin of the palm and the hairy skin of the forearm. Furthermore, this study also reveals that, compared to the scene visual context, the visual context of facial expressions with a social component increased the differences between the effects of the three stroking forces on the perception of affective touch.

Lastly, to investigate whether visual stimulus size and viewpoint of observation affect the perception of affective touch across human skin. Five naïve, healthy participants selected three appropriate viewpoints of observation from 24 different viewpoints using a seven-point scale. Then, fifteen healthy participants rated tactile pleasantness on a visual analogue scale (VAS) when they were stroked with a soft brush on the palm or forearm accompanied by viewing different sizes of visual stimulation from different viewpoints. The current study suggests that the viewpoint of observation affects the perception of tactile pleasantness, but visual stimulus size has no significant effect on tactile perception.

According to the current studies, tactile stimulation is typically perceived as more pleasant on hairy than on glabrous skin. Furthermore, the hairy skin of the forearm is more susceptible to stroking hardness than the glabrous skin of the palm in the range perceived as affective touch. Additionally, we highlight the same effects of visual contexts on the tactile pleasantness ratings from the glabrous skin of the palm and the hairy skin of the forearm. Meanwhile, the results show that the viewpoint of observation affects the perception of tactile pleasantness, but visual stimulus size has no significant effect on tactile perception.