

---

# Exploring Central and Peripheral Mechanisms of Affective Touch through Apparent Motion

Laura Pehkonen<sup>\*†</sup>, Ilona Szczot<sup>1</sup>, Bengt Ragnemalm<sup>1</sup>, Håkan Olausson<sup>1</sup>, and Sarah McIntyre<sup>1</sup>

<sup>1</sup>Center for Social and Affective Neuroscience (CSAN), Linköping University, Linköping – Sweden

## Abstract

Although the general outlines of pleasant touch perception and CT-afferents have been sketched out, the current extent of knowledge still pales in comparison to the depth of information surrounding other neural pathways and somatosensory modalities, e.g., pain and nociceptive C-fibres.

This project explored the peripheral and central mechanisms in affective touch, through comparing gentle stroking with apparent motion – an illusory perception of movement constructed by successively presented tactile stimuli. If similar patterns in the relationship between pleasantness-ratings and velocity were observed despite the elimination of lateral movement, then central modulation may govern the velocity dependence of the perception of pleasant touch.

To investigate this relationship, pleasantness-ratings were collected across an array of velocities (1, 3, 10, 30, 100 and 300 mm/s), under these two conditions, in 23 healthy participants.

Linear and quadratic regression analysis were performed on group- and individual-level, for both conditions. For brushing-like motion, a significant negative quadratic term was observed (R-square=0.126, F=29.033,  $p < 0.001$ ,  $\beta = -1.275$ ), with peak pleasantness achieved at 19.7 mm/s. For apparent motion, a similarly significant inverted-U shaped curve was observed (R-square=0.051, F=10.938,  $p < 0.001$ ), accompanied by a statistically significant linear term (R-square=0.015, F=6.287,  $p = 0.013$ ). Overall, multiple significant differences and similarities were observed.

In summary, these findings suggest that the perception of pleasant, affective touch is a complex construct relying on not only the unique peripheral properties of CT-afferents, but even other pathways and central modulation. In particular, the velocity tuning of pleasantness in apparent motion cannot be attributed to velocity tuning of individual CT-afferents.

**Keywords:** Affective touch, CT, afferents, Apparent motion

---

\*Speaker

†Corresponding author: laupe912@student.liu.se