# The perception of local skin wetness during visuotactile interactions at the fingerpad.

Charlotte Merrick*†[1], Rodrigo Rosati[2], and Davide Filingeri[3]

[1]THERMOSENSELAB, School of Design and Creative Arts, Loughborough University – United Kingdom

[2]Procter and Gamble Service GmbH, Schwalbach am Taunus – Germany

[3]THERMOSENSELAB, Skin Sensing Research Group, School of Health Science, University of Southampton – United Kingdom

**Abstract**

**Introduction**

Many sensory modalities underlie humans' experience of wetness, yet we know little of how tactile inputs are affected by visual cues during haptic interactions with wet materials. We aimed to investigate the effect of visuotactile vs. visual only interactions on wetness perceptions with stimuli varying in physical stain volume, intensity, and size.

**Methods**

Eighteen participants (10F/8M; 22.3±3.6y) performed two trials during which they either visually observed (visual only trial) or visually observed and used their index fingerpad to touch (visuotactile trial) absorbent materials varying in physical stain wetness (0, 2.16x10-4 or 3.45x10-4 ml/mm2 of saline), intensity (clear, light, dark) and size (1150 or 5000 mm2). Participants rated wetness perception using a 100 mm visual analogue scale (very dry to very wet).

**Results**

Wetness perceptions differed between visuotactile and visual only interactions ($P < 0.001$). Specifically, during visuotactile interactions participants perceived different magnitudes of wetness in line with the physical wetness levels of stimuli, whereas without the tactile component participants could only discern whether the stimuli were dry or wet. During both trials, greater stain intensity resulted in increased wetness perception ($P < 0.001$; $P < 0.001$), but stain size had no significant effect in either visual only ($P=0.330$) or visuotactile interactions ($P=0.079$).

**Conclusions**

Visuotactile interactions allow improved wetness magnitude discrimination over visual only cues, highlighting the key role of touch over vision in the multisensory integration of wetness perception. Findings are relevant for the design of wetness management products and in augmented or virtual realities.

**Keywords:** wetness, tactile, visual, skin, sensation

*Speaker

†Corresponding author: ckmerrick@live.co.uk