

Tactile coding on the fingers and toes: insights from double simultaneous stimulation across limbs



Kelda Manser-Smith¹, Matthew R Longo¹ & Luigi Tamè²

¹Department of Psychological Sciences, Birkbeck, University of London, London, UK

²School of Psychology, University of Kent, Canterbury, UK



Introduction

A series of studies has shown that there are common representations and peculiar interactions between homologous fingers of the two sides of the body. When a tactile stimulus needs to be detected on a finger of one hand participants performance is impaired if the non-homologous finger of the other hand is simultaneously stimulated. However, there is no or less impairment if the homologous finger of the other hand is stimulated¹. Common representations between hand and foot have suggested². However, it is unknown whether such interactions are also present across different limbs that are morphologically similar such as hands and feet.

Aim

In this study, we performed a similar experiment stimulating the digits of the hand and foot, showing that similar results emerge also when different limbs are stimulated.

Materials and Methods

Task: Detect a vibrotactile target (go-no-go task) at a pre-specified digit (e.g., left index), when this was presented alone or with a concurrent distractor either on the same hand (left middle finger), or on the foot (at homologous or non-homologous locations with respect to the target finger; e.g., Thumb or second toe, respectively).



Conditions

- Target only
- Target + same limb distractor
- Target + distractor on different limb same (homologous) digit
- Target + distractor on different limb different (non-homologous) digit

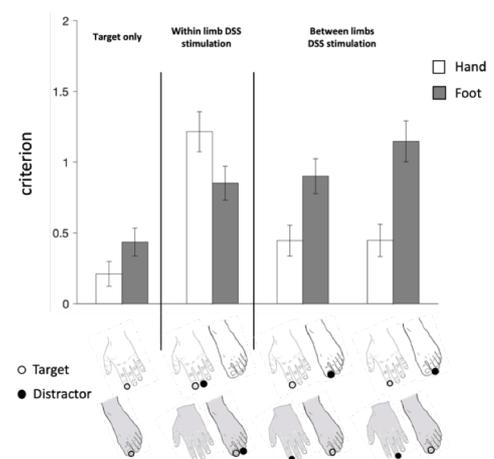
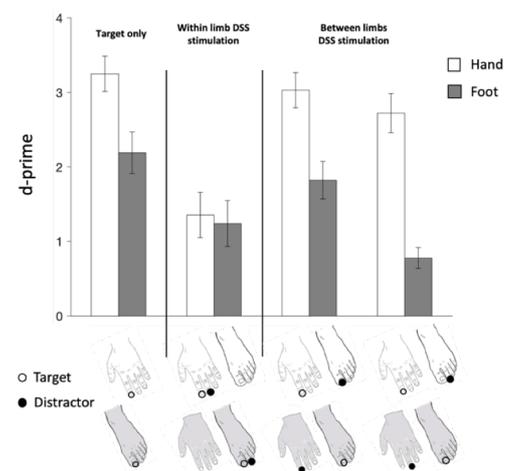
Conclusions

The results of the current study reveal two effects: **1)** DSS of homologous digits across the upper and lower limbs does not alter tactile sensitivity, regardless of the stimulated body parts (hand and foot); **2)** there is a selective interference when DSS is applied on non-homologous digits when the target is a digit on the foot, but not when it is a digit on the hand.

References

1. Tamè et al., 2011, Neuroscience Letters
2. Manser-Smith et al., 2018, Journal of Experimental Psychology: Human Perception and Performance

Results



Correspondence to: l.tame@kent.ac.uk