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The Effect of Attention Saturating Task on Eyes-free Gesture Production on Mobile Devices

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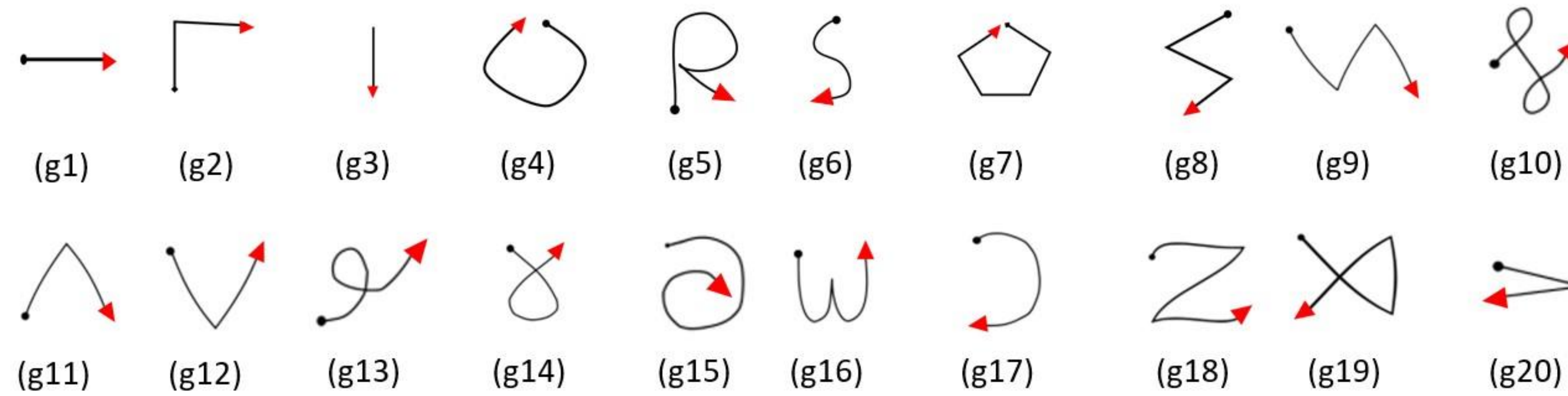
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Introduction

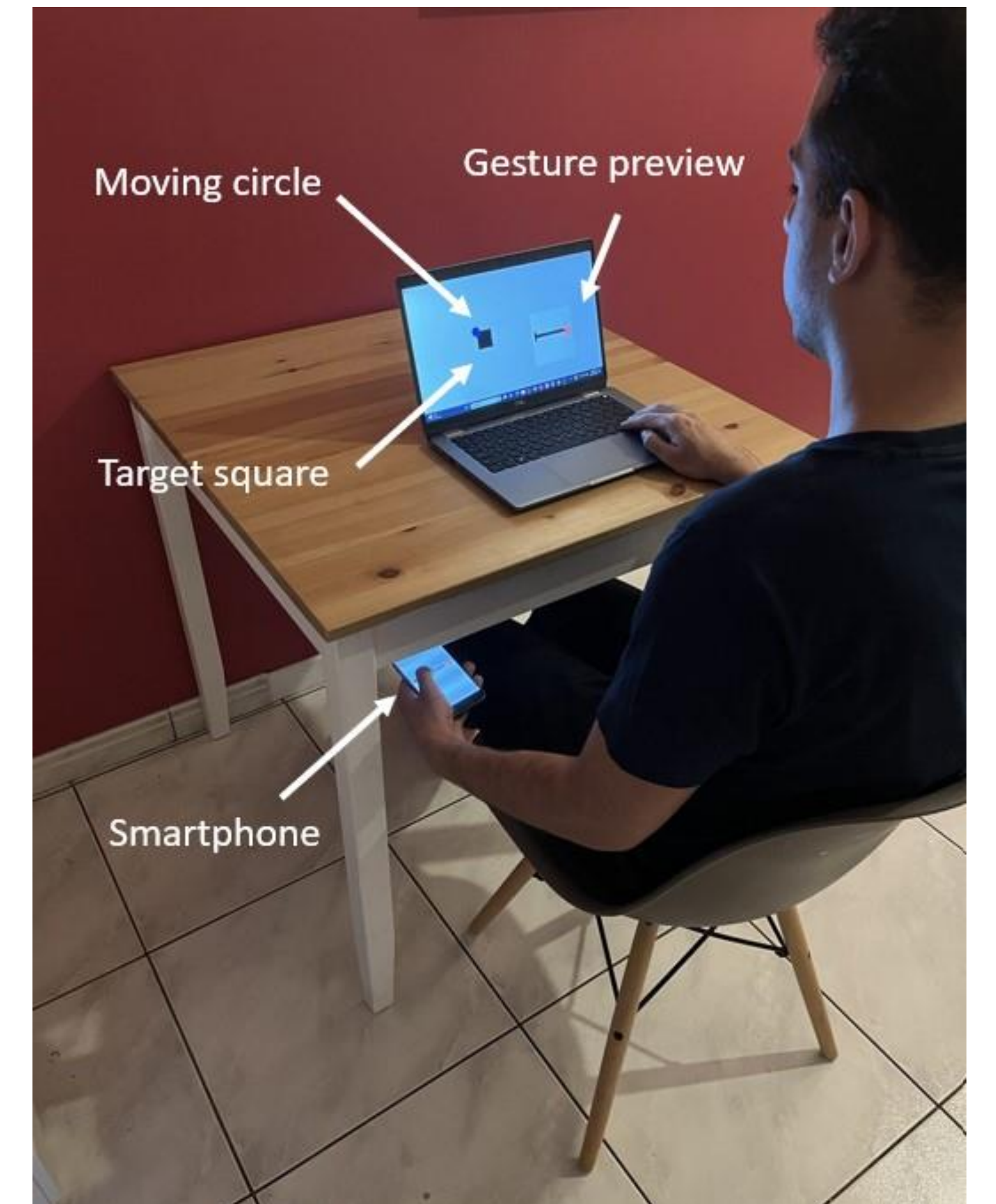
Touch screens are popular input methods for mobile devices, but they compete for visual attention with users' real-world tasks, leading to performance hindrances. In this study, we investigated the effect of a saturation attention task on eyes-free gesture production. A user study was conducted with 13 participants who performed eyes-free gestures on a smartphone using their dominant or non-dominant hand, either alone or while performing a primary task.

Methods

- 13 Right handed participants (7 males and 6 females)
- Experiment design 2x2:
 - Activity: control condition, attention saturating task
 - Used hand to hold the phone: Right, or Left
- 20 Gestures × 5 repetitions

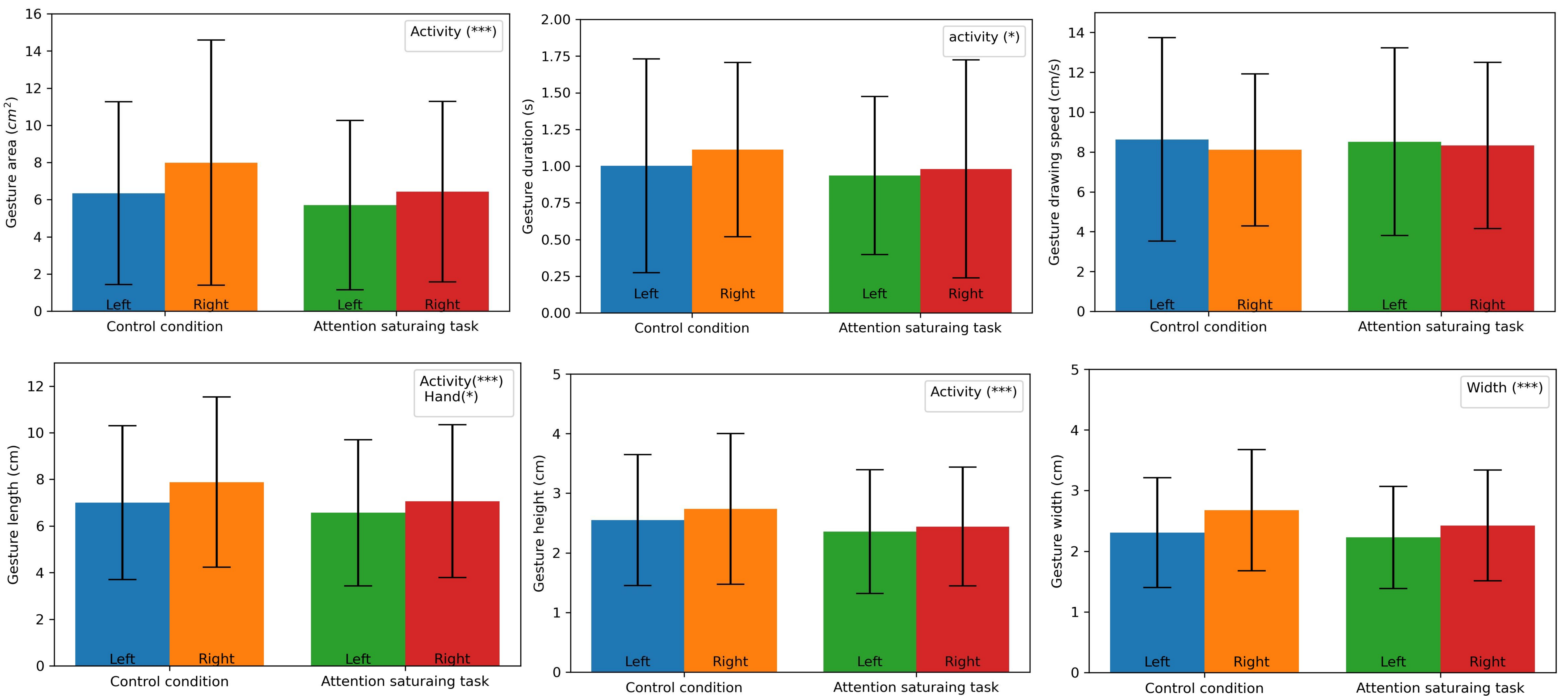


(Gesture set)



(Setup)

Gesture Features



Qualitative Findings

Mental workload dimension	Right hand + control condition	Left hand + control condition	Right hand + Attention saturating task	Left hand + Attention saturating task
Performance	6.15 ± 1.81	6.23 ± 1.59	6.61 ± 2.02	6.53 ± 1.76
Temporal demand	2.23 ± 1.42	2.31 ± 1.60	2.54 ± 1.45	2.00 ± 1.68
Physical demand	3.08 ± 1.66	3.06 ± 1.71	3.15 ± 2.27	4.32 ± 2.71
Mental demand	3.84 ± 1.95	3.74 ± 2.26	3.38 ± 1.76	3.69 ± 1.97
Frustration	2.69 ± 1.55	3.54 ± 1.66	3.23 ± 2.17	5.46 ± 2.54
Effort	4.30 ± 2.25	4.38 ± 2.06	3.92 ± 2.78	5.46 ± 2.10

Conclusion

The results indicated that performing another task while drawing a gesture shortened the length and size of the gesture. Conversely, drawing a gesture with the left hand increased the length of the gesture. Additionally, engaging in another task while drawing the gesture reduced the duration of gesture entry, while the finger maintained the same speed across the touchscreen. Using the left hand to produce eyes-free gestures when performing an attention-saturating task is also more frustrating and demands more physical effort than when using the right hand or when there is no primary task.

Acknowledgements



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