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The role of active touch: differential mechanism in blindness

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Introduction

Research focus on active touch lead to the conclusion that its advantage on the perception might depend on the experimental task [2]. In fact, passive and active touch are two different process, with some studies showing a suppression of afferent information to the somatosensory cortex during active touch. This is called *movement-related sensory gating* and could lead to a worst encoding [3]. Another open discussion refers to the possible enhanced tactile sensitivity in blind individuals, with some authors reporting better performance in this group compared to their sighted counterparts [4], while others found no differences between the groups [5], highlighting the important role of familiarity and experience in their performance [6].

With this work, we wanted to shed some light into the role of active touch in sighted and blind individuals using dynamic stimuli discrimination.

Method

Participants:

- 18 sighted
- 18 blind

Task:

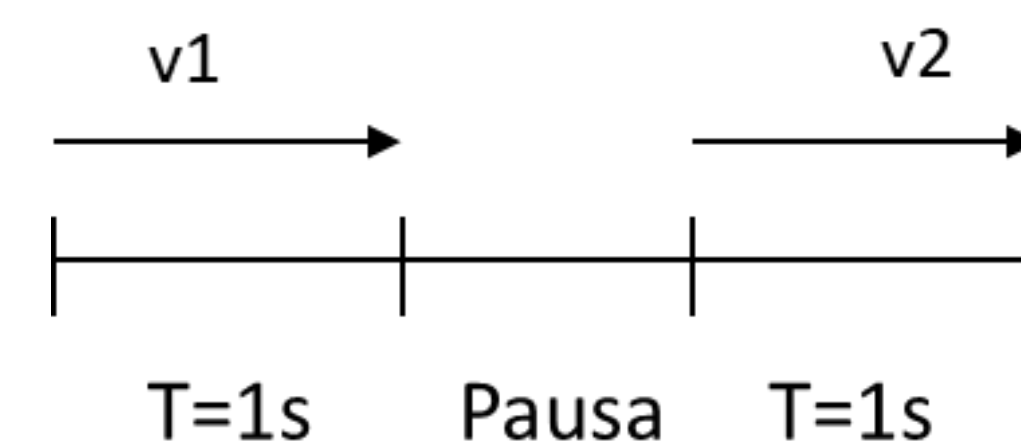
2AFC - The participant has to perceive a sequence of two movement with different speeds and to discriminate which was faster between the two.

Standard velocity:

3 cm/s

Comparison speed:

QUEST [6]

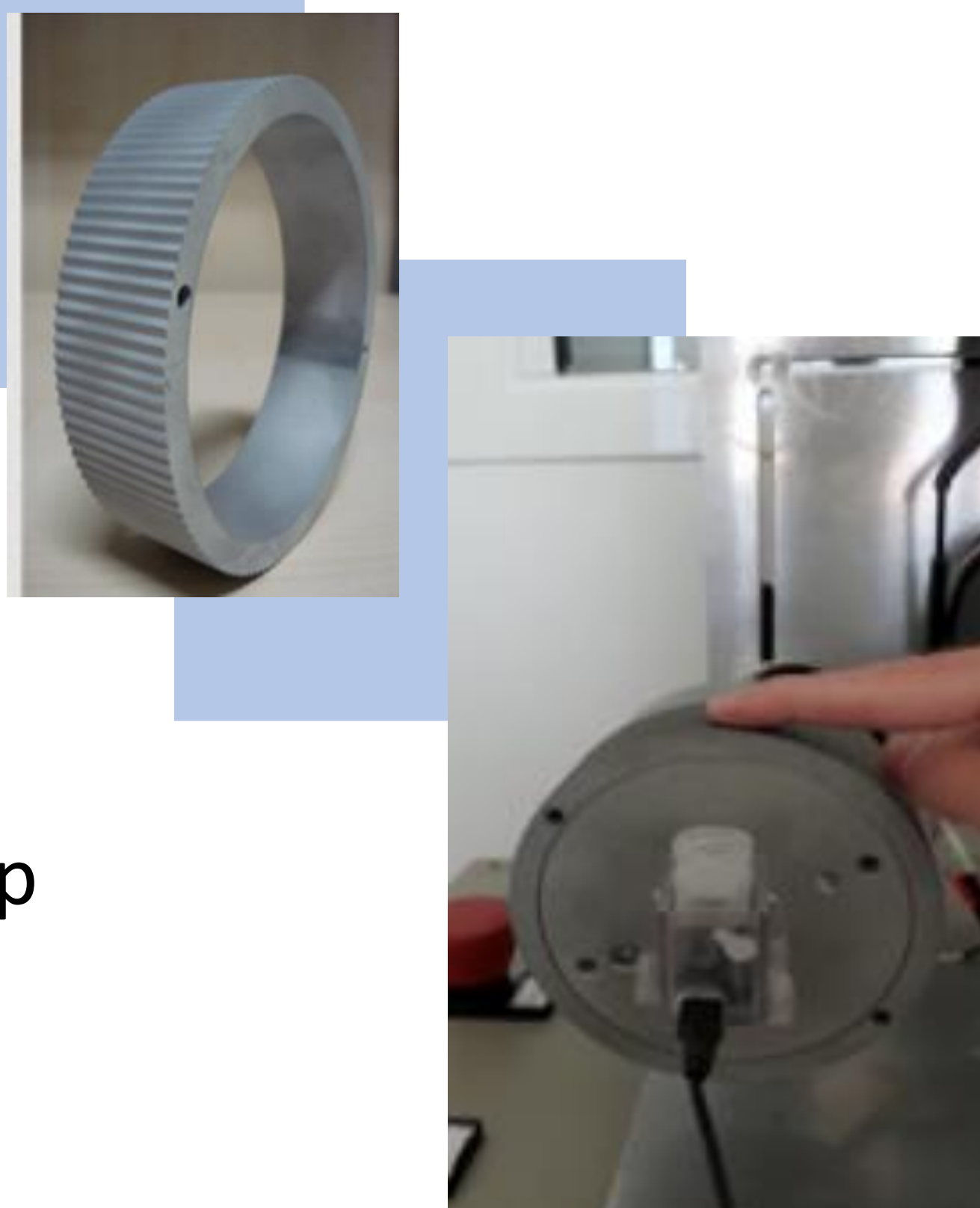


Conditions:

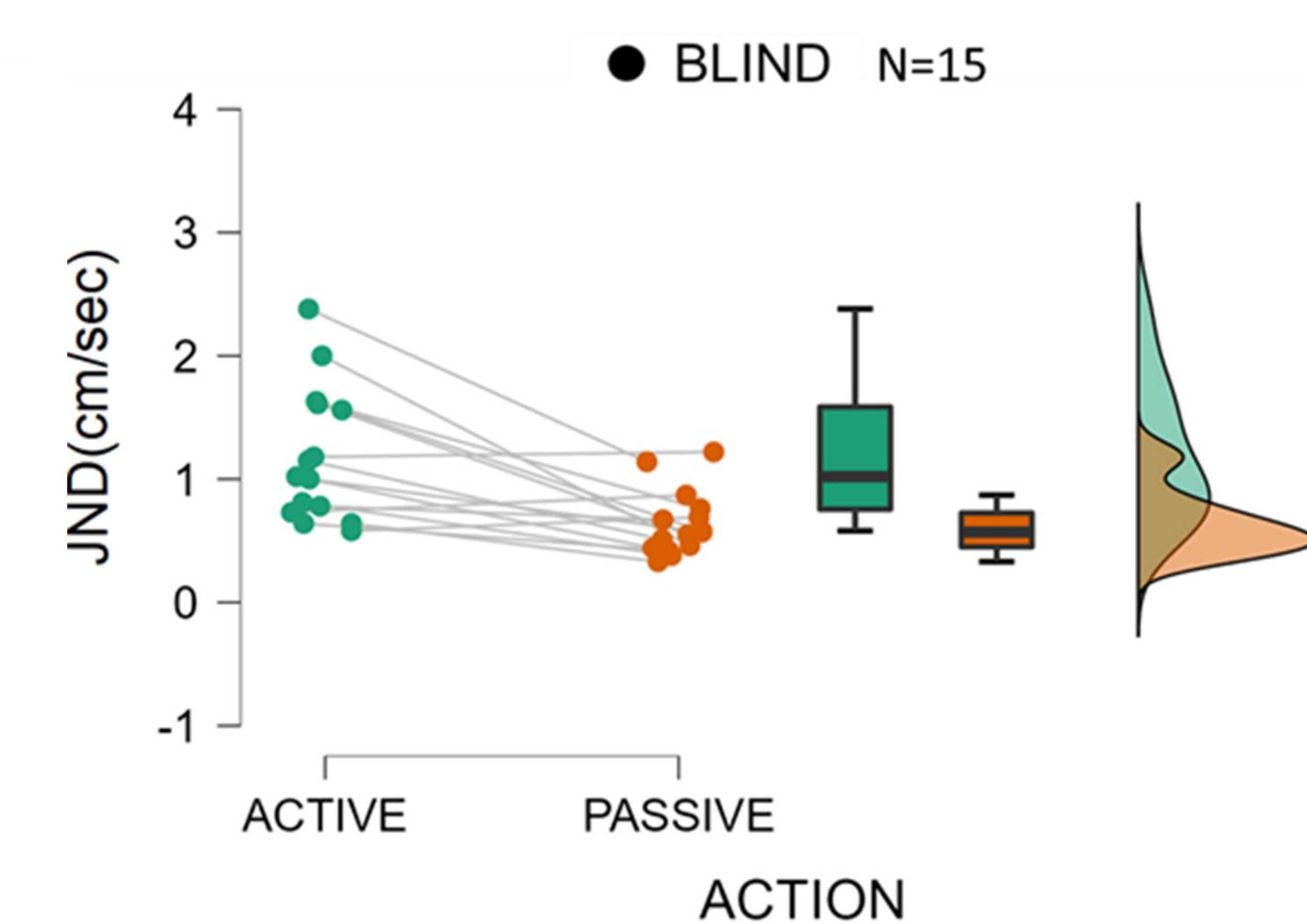
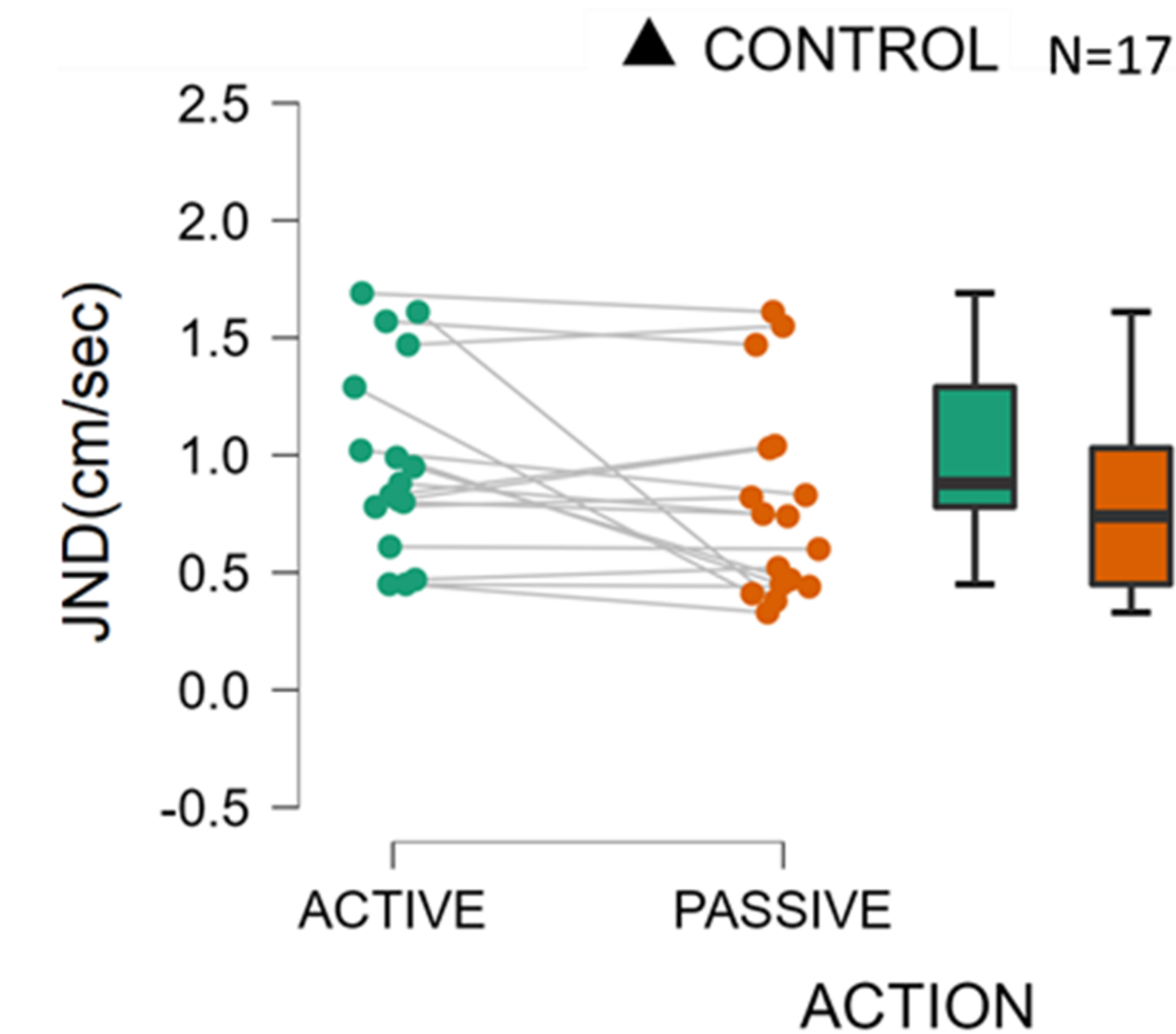
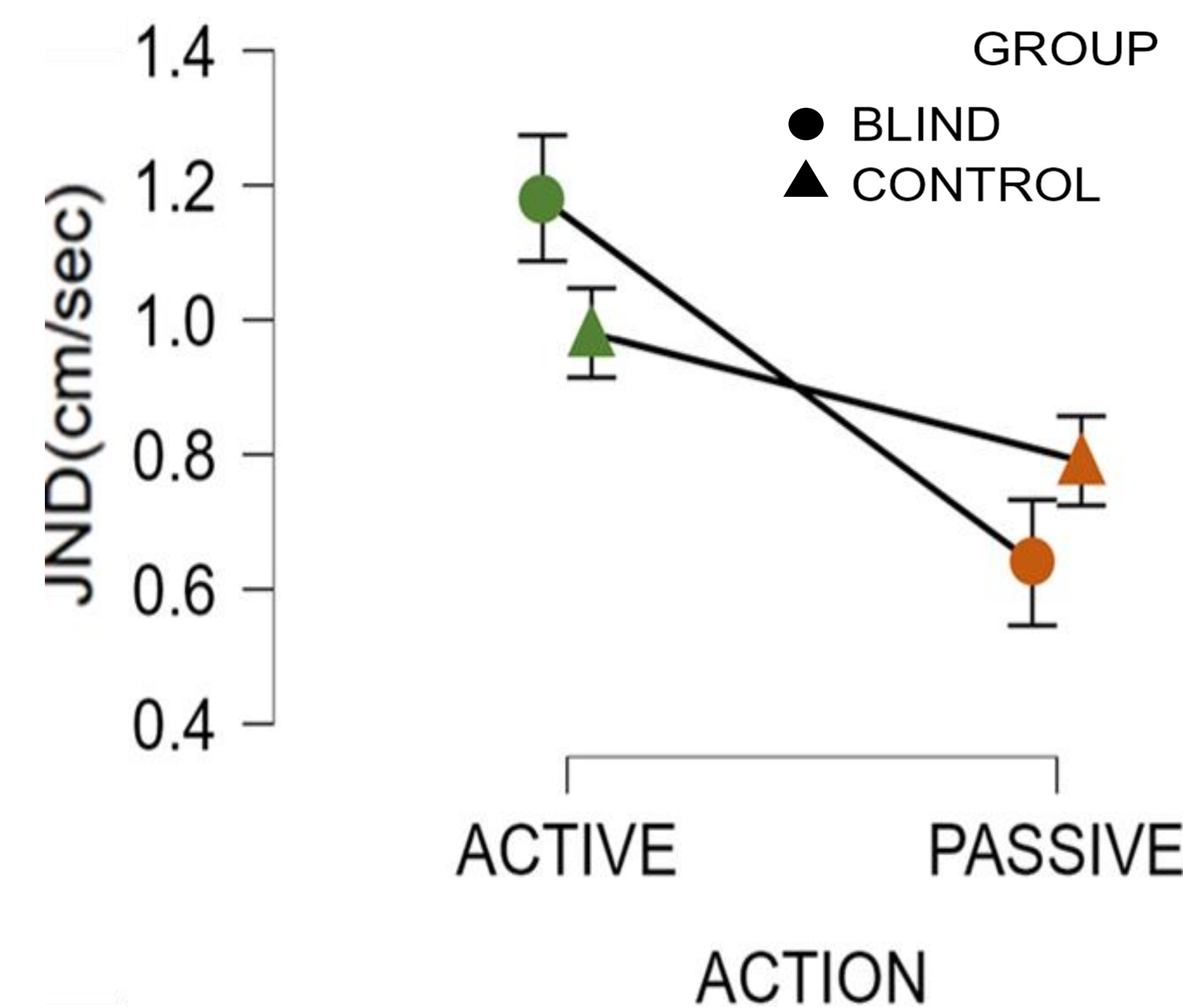
- Passive touch
- Active touch

Stimulation:

- Tactile stimulus: 10 cycles/cm
- Tactile area of stimulation: fingertip of index



Results



Group*Action $p=.035^*$

Post Hoc: significant differences between Blind-Active and Blind-Passive $p<.001^{***}$

Conclusions

Sighted individuals:

No differences between the Active and Passive conditions

The similar performance might be caused by an enhanced transmission due to central influences, such as attention and motor set [1]. Also, as active touch involves kinaesthesia and proprioception combined with the cutaneous perception [7] the integration of this information might also contribute to maintain the threshold.

Blind individuals:

Significant worse performance in the active condition

Blind individuals might be more sensitive to movement-related sensory gating. This might be due to the weakened proprioceptive spatial representations [8] and their difficulty to optimally integrate multisensory information [9].

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