# Effects of a non-informative auditory feedback over touch in the blindness

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## Introduction

The mechanisms underlying passive and active touch are different, with active touch leading to an attenuation of afferent somatosensory information to the cortex. This is known as *movement-related sensory gating* and could be responsible for a worse encoding [1,2,3]. When we have multisensory information one sense can dominate the perception according to its reliability [4]; if noise is added to the signal, its reliability changes, thus their dominance [5]. When there is ambiguation, we integrate multisensory information to infer the most likely interpretation of the sensory input [6]. However, this process is vulnerable to the loss of a sensory modality: the lack of visual calibration over the tactile and audio modality can modulate their integration, with blind individuals showing a reduced multisensory interaction [7].

**How a non-informative sound might affect the tactile performance during passive and active touch in blind and sighted individuals?**

## Method

### Participants:

- 18 sighted : 12 women; age mean +- SD: 35.11 +- 11.72
- 18 blind: 10 women; mean age +- SD: 41.67+- 11.9 years)

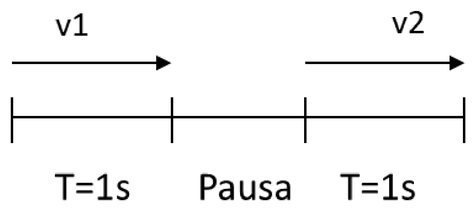
### Conditions:

**Passive and Active**

- Unimodal tactile (T)
- Bimodal audio-tactile (AT)

### Task:

2AFC - Sequence of two movement with different speeds and to discriminate which was faster between the two.

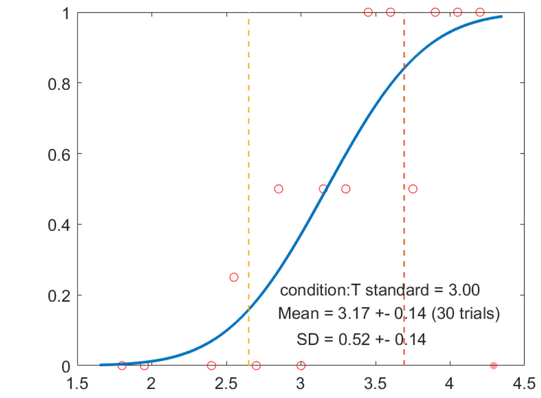



Standard velocity: 3 cm/s
Comparison speed: QUEST [6]

### Stimulation:

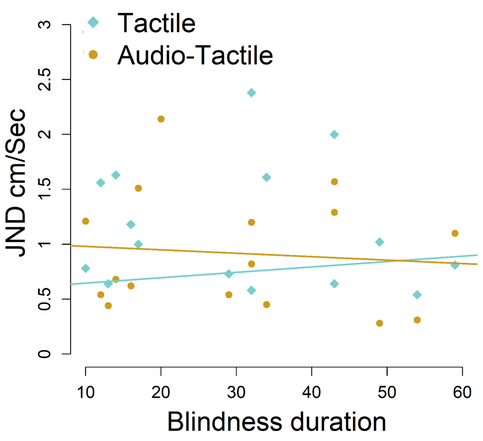
-Tactile stimulus: 10 cycles/cm
-Tactile area of stimulation: fingertip of index

## Results

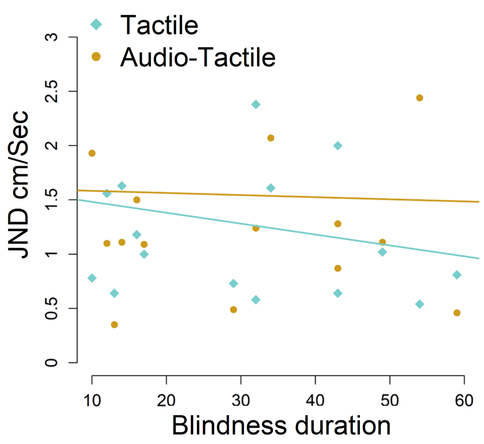



Data fitted to Cumulative Gaussians
Threshold or just noiceable difference (JND) from the SD of the psychometric curve

### BLINDNESS DURATION - PASSIVE CONDITION

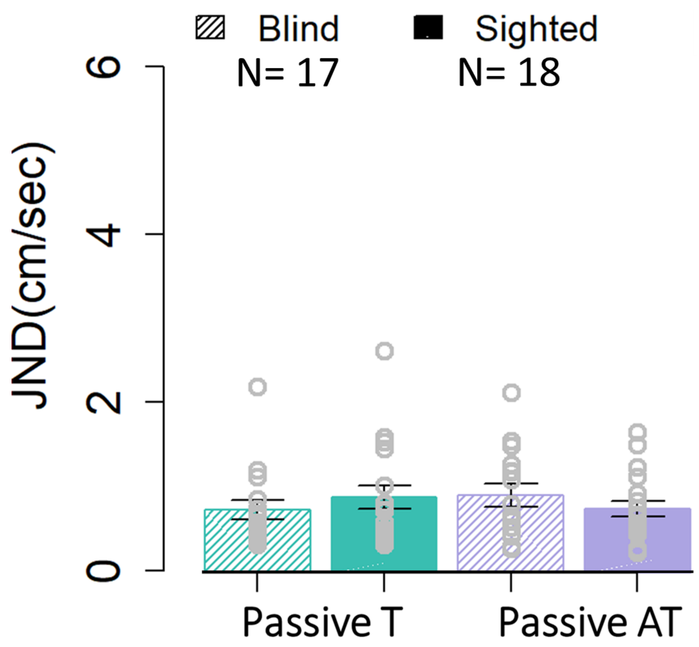



### BLINDNESS DURATION - ACTIVE CONDITION

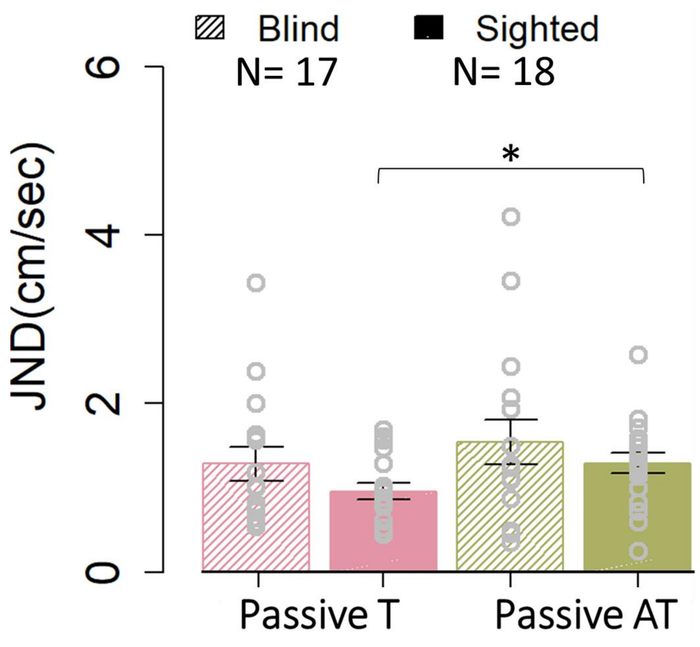



**No correlation blindness duration and performance**

### PASSIVE CONDITION




### ACTIVE CONDITION




**Significant difference between T and A-T conditions in the active condition (p=.0462) only for the sighted group**

## Conclusions

### Sighted individuals:

- No differences between the tactile and audio-tactile conditions during passive touch

  In our case, tactile information might be reliable enough not to require extra sensory information.

- **Significant difference between the tactile and audio-tactile conditions during active touch**

  The somatosensory gating, as it reduced the amount of sensory information processed by the cortex [2], might increase the ambiguity of tactile information, making sighted participants more vulnerable to the noise of the auditory signal.

### Blind individuals:

- No differences between the T and A-T conditions during passive touch
- **No differences between the T and A-T conditions during active touch**

  Our results support the presence of reduced audio-tactile interactions in blind individuals [7] and suggest that it might be responsible for higher resistance to noisy interference, despise the somatosensory gating originating from the self-generated movement in this group

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