

# innovating tomorrow's travel experiences



Prof dr Peter Vink

**But first: this is not future boarding**



Suitcase is in hotel  
when leaving  
from home





# Effects tested (n=296):



-12,5%= - 2.2 min (for 18 min boarding)

More important the experience: comments of participants:

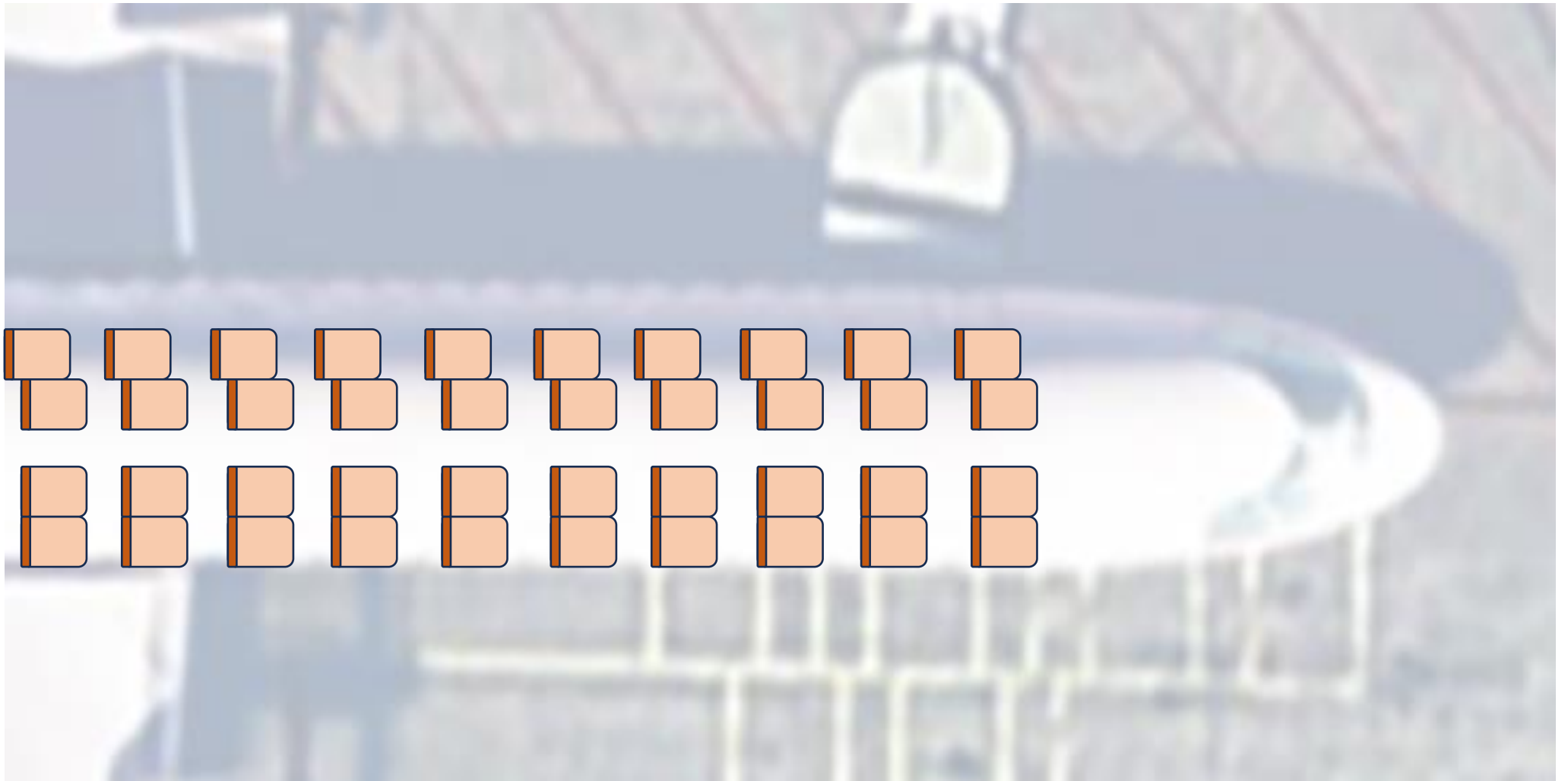
Easier, faster, simpler, more  
satisfying, relaxed, more organized,  
easier to find the seat (Coppens et al., 2018)

**PERSONALIZED DEVICE**

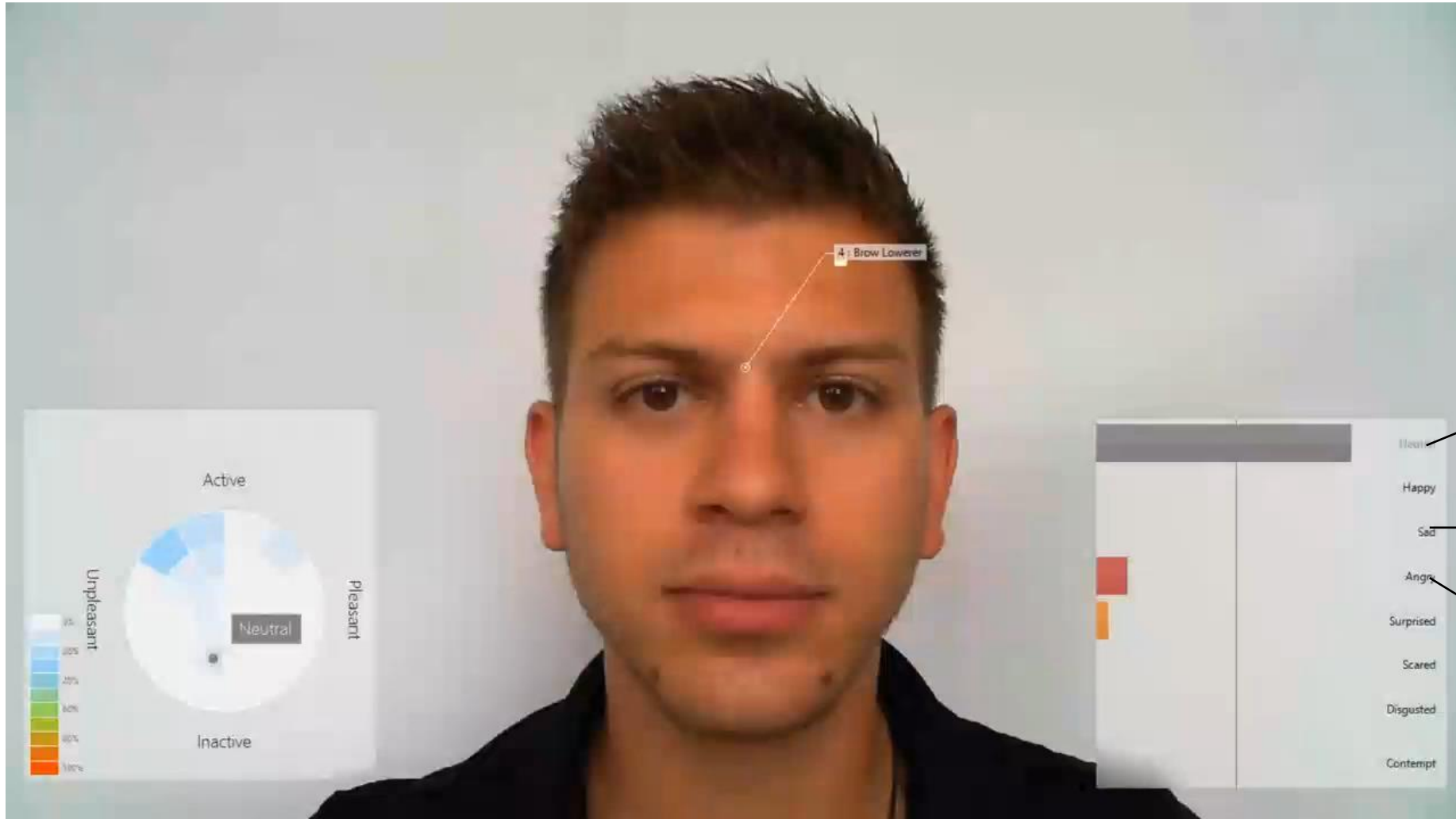
**AI helps you**

210  
**BOARDING NOW**  
**Go to gate F8**

seat selected based on previous emotional experiences by AI (Bartkiene et al., 2019))



# Facereader records 9 emotions



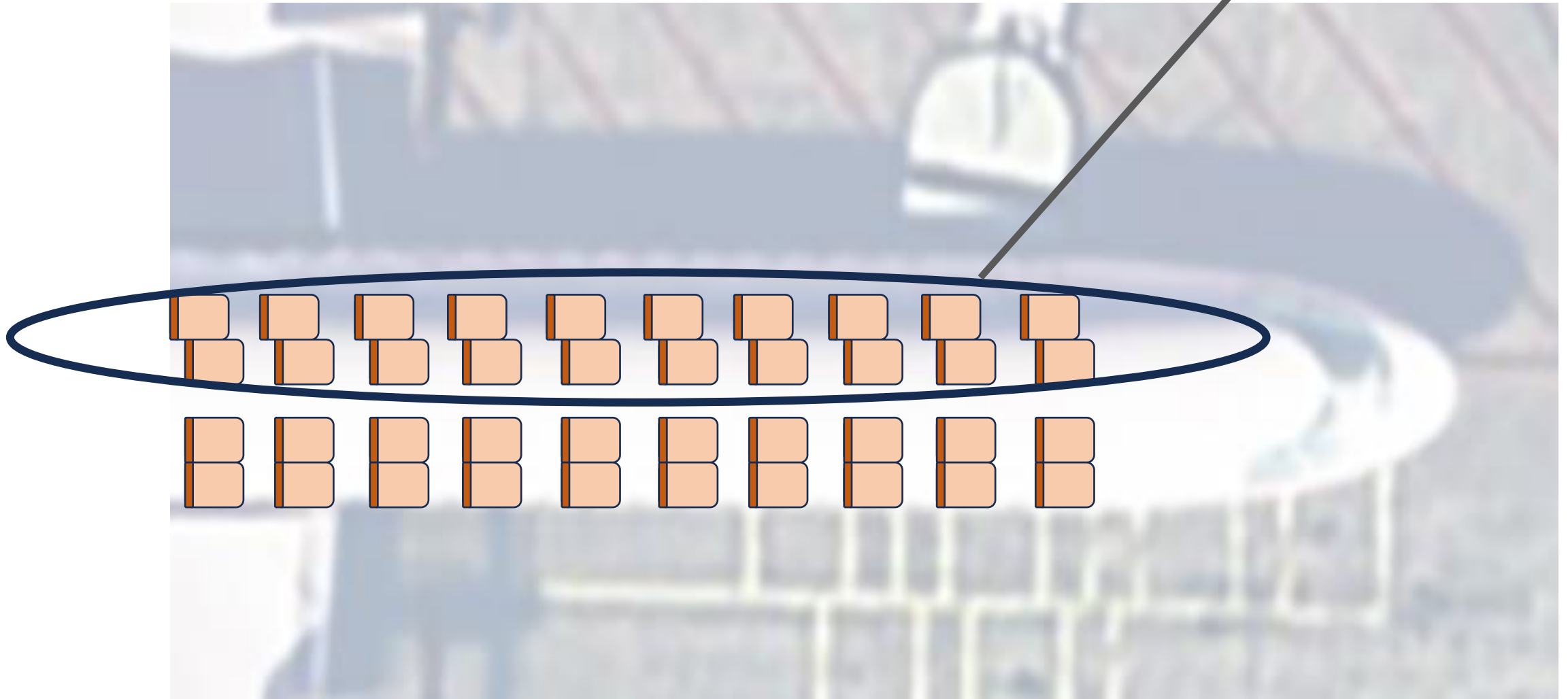
happy

sad

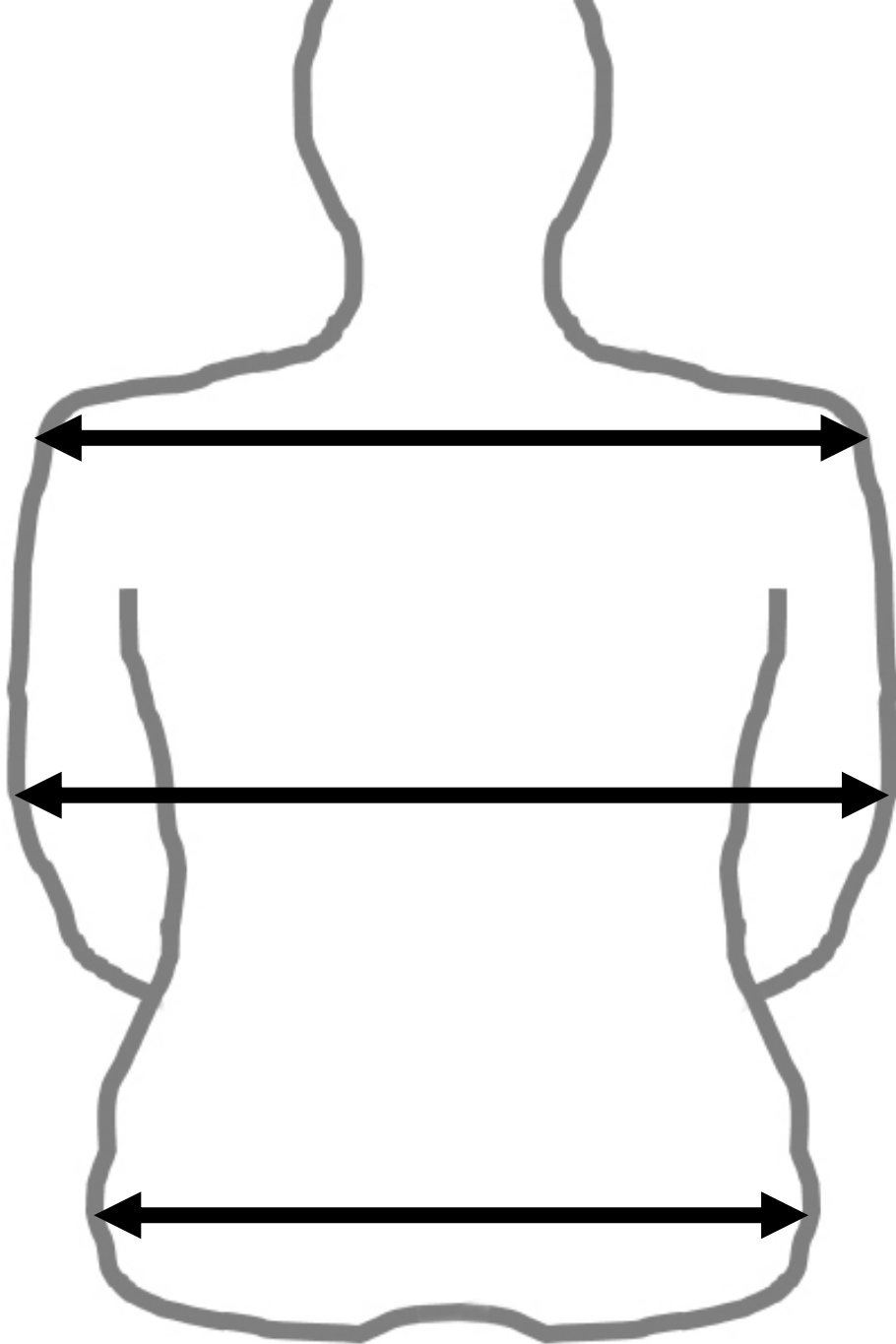
angry



Emotions = input for preferred seat, eg staggered







Aircraft seat ( 18" wide)

Shoulder breadth

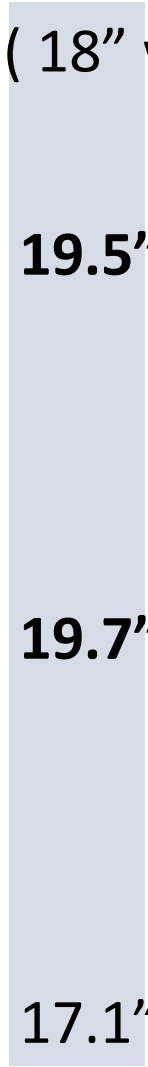
**19.5"** for p95 male

Elbow width:

**19.7"** for p95 male

hipbreadth:

**17.1"** for p95 female





# Comparison staggered vs 'normal' seat

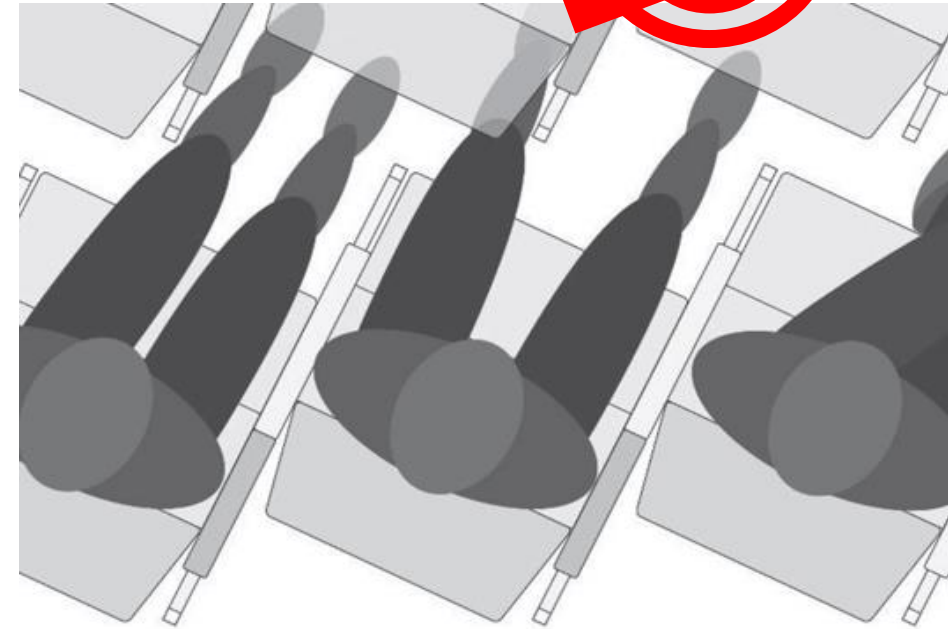
total comfort score (1-10),  
n=117, 11-67 years old, 31" pitch

Staggered

7 (SD=1.75)\*

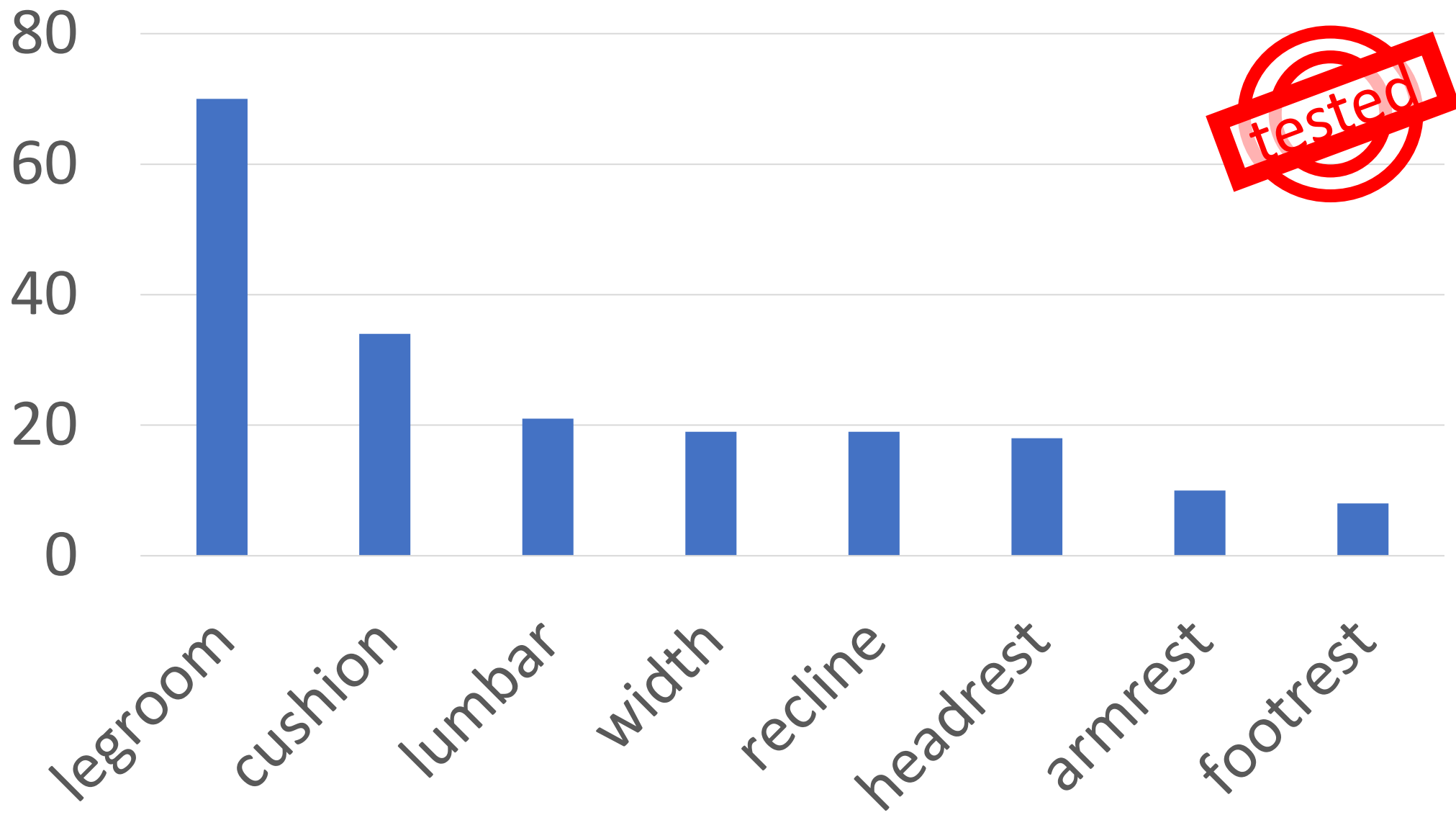
'normal'

6.4 (SD=1.78)\*



However, seat hardness was too high for staggered seats (Vink et al., 2021)

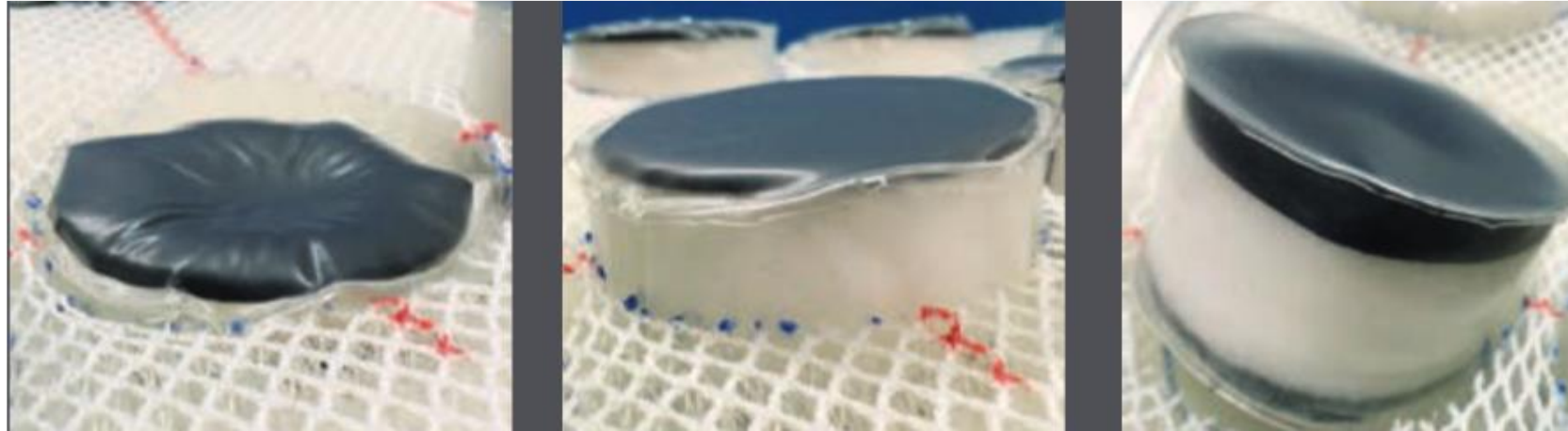
Priority to improve



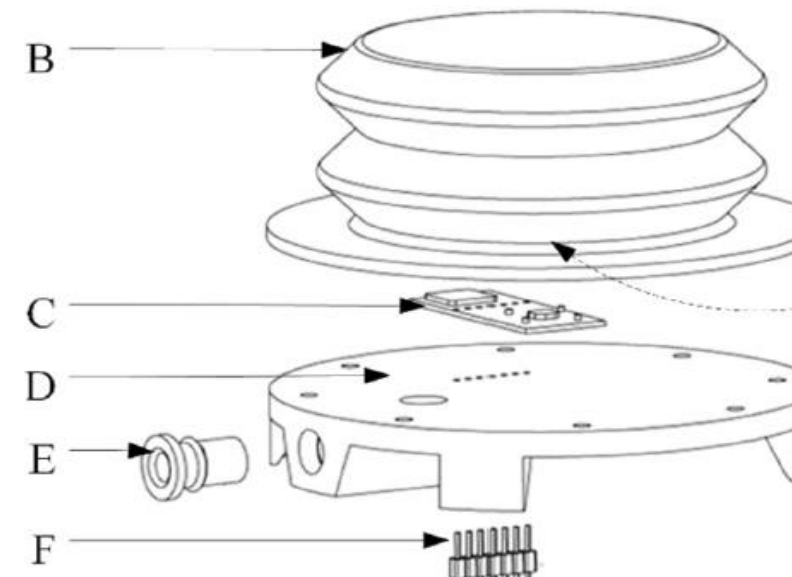
n=246, Nijholt, 2018

# Self forming light weight cushions in seats

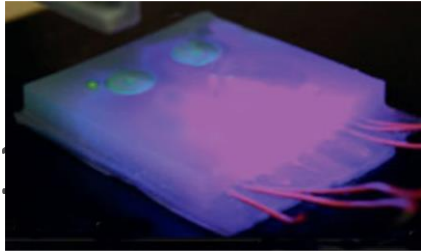
- Vacust:



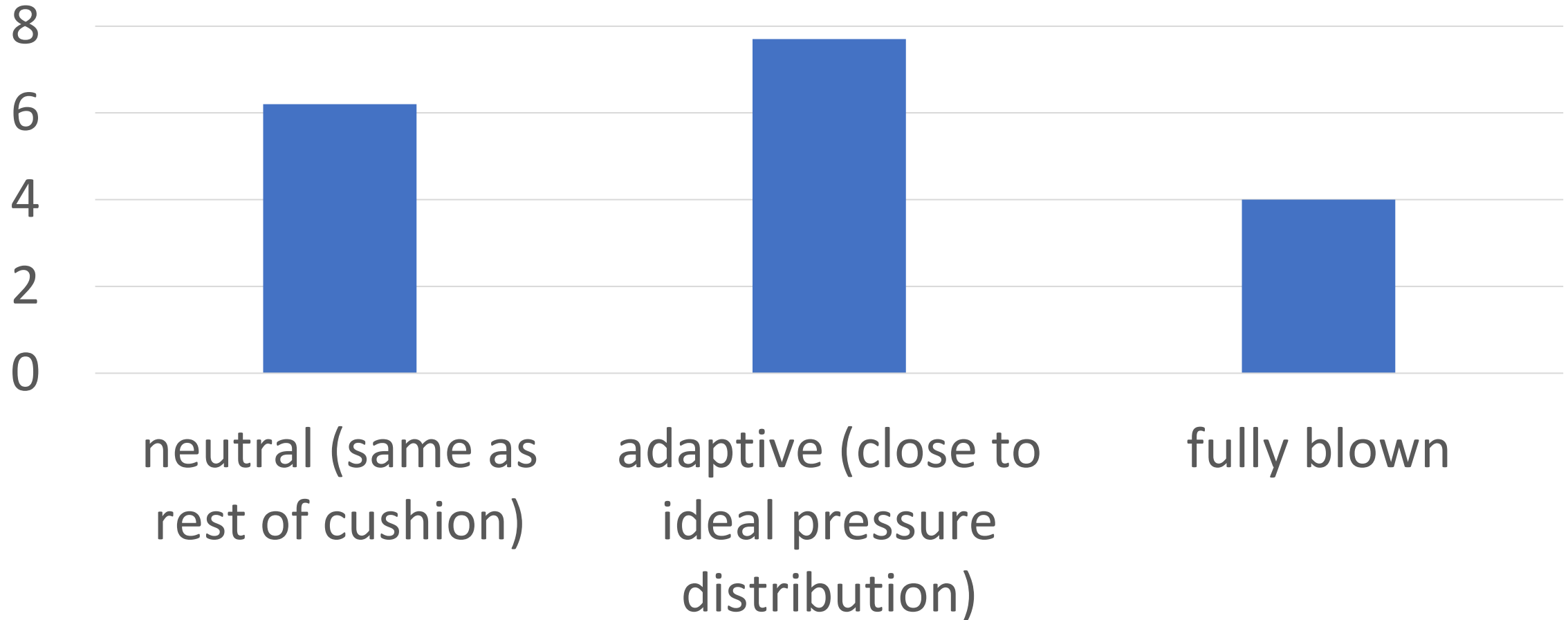
- Soft-robotics



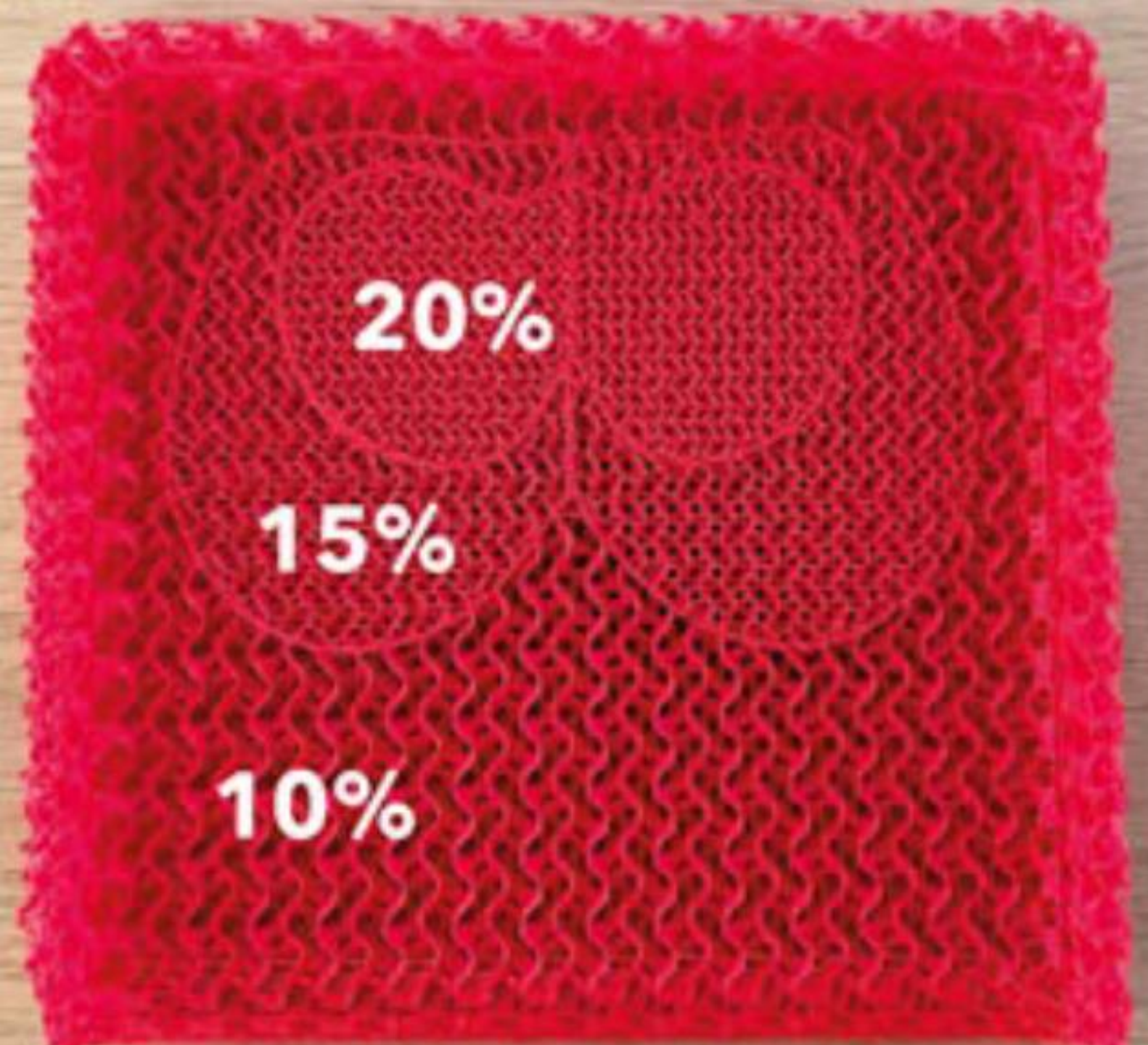
# Comfort of softrobotics unit (Roosendaal et al., 2022)



2 units under sitting bones







**20%**

**15%**

**10%**

Light weight  
and  
sustainable  
TPU with  
different  
infill  
percentages



*The top layer is cactus leather*

Seat/interior is task related, e.g.:

Sleep / food / IFE



And seats should stimulate posture variation



please stand up now



*Zeg hardop:*

More comfort  
by variation in  
posture



*Say out loud*

more comfort  
by variation in  
posture

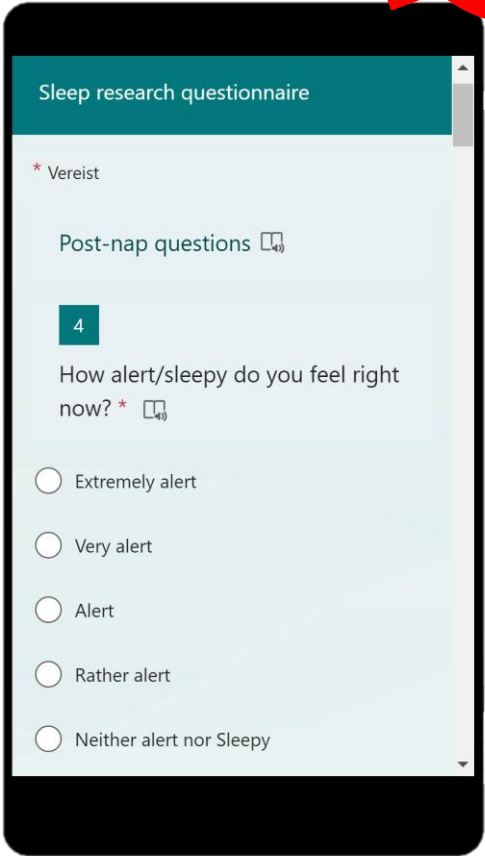
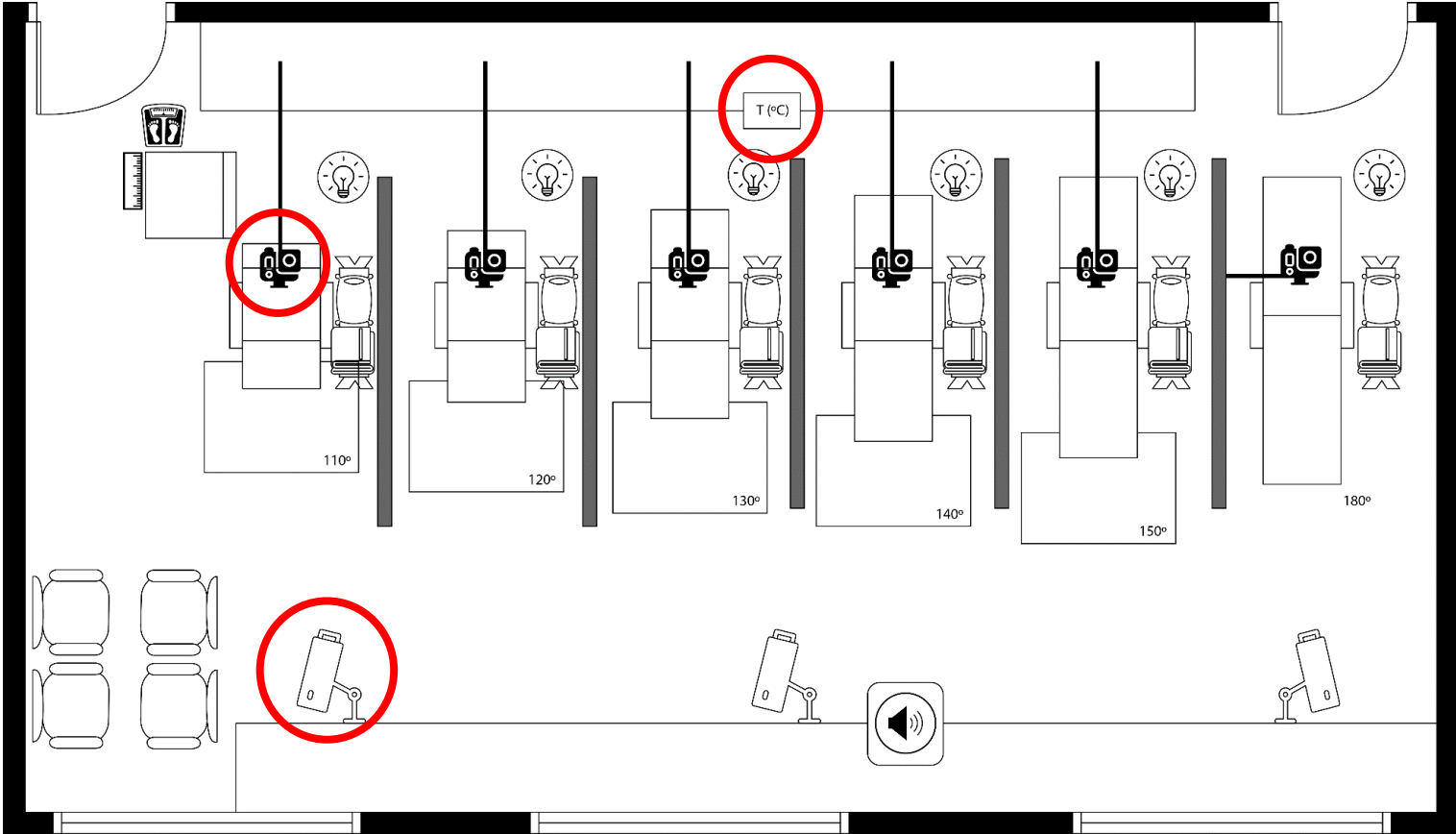
tested



- Selection out of 116 persons that nap during the day
- 30 selected and come 7 times at the same time of the day, order varied
- 90 minutes (to have a least one sleep cycle)
- Only 16 did 7 times in the end



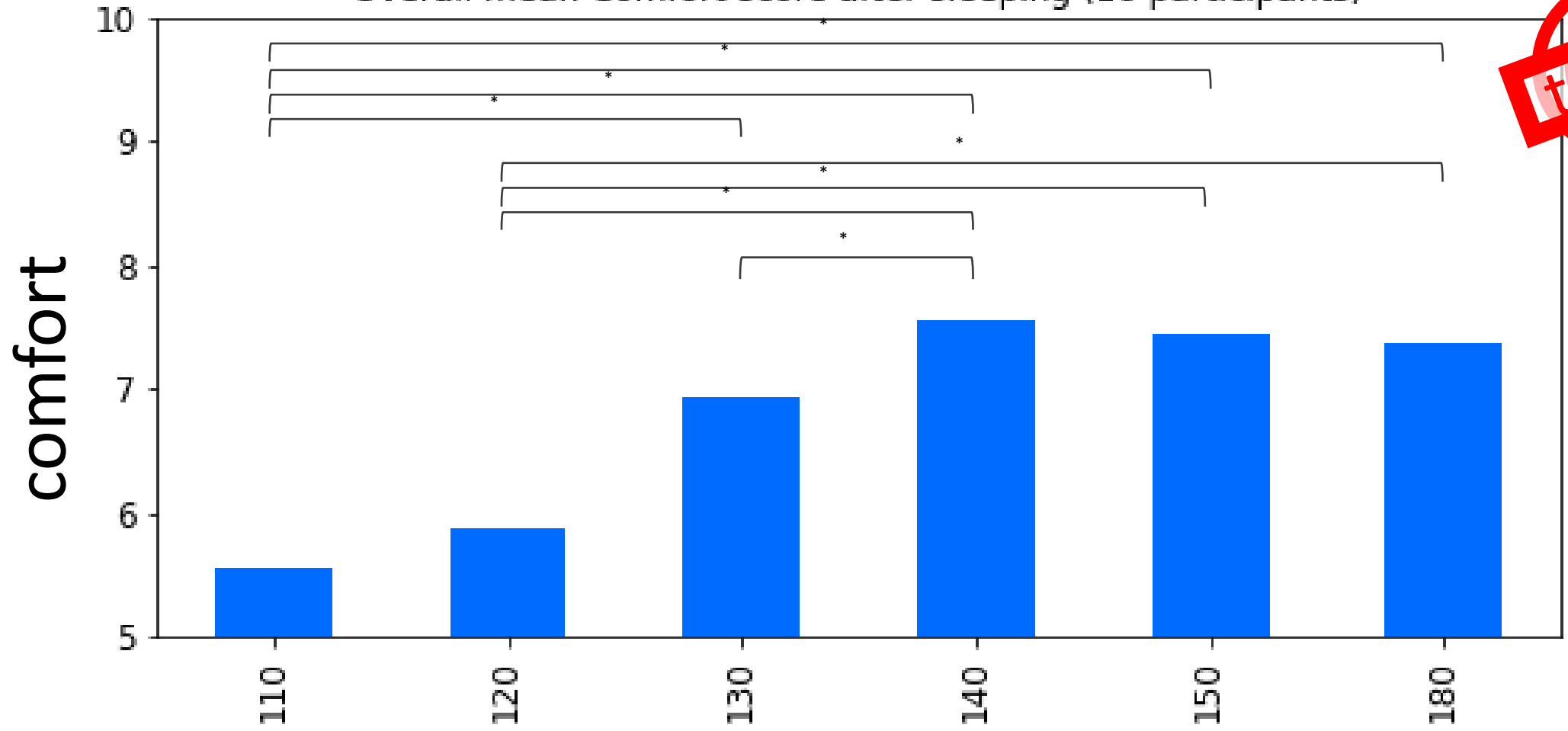
# Research setup



# Research setup monitored




Overall mean Comfort score after sleeping (16 participants)



\* sign.  $p < 0.05$ , Wilcoxon signed rank test



# System to get you to sleep and awaken



sound



light



angle  $140^\circ$

vibration





**environment**

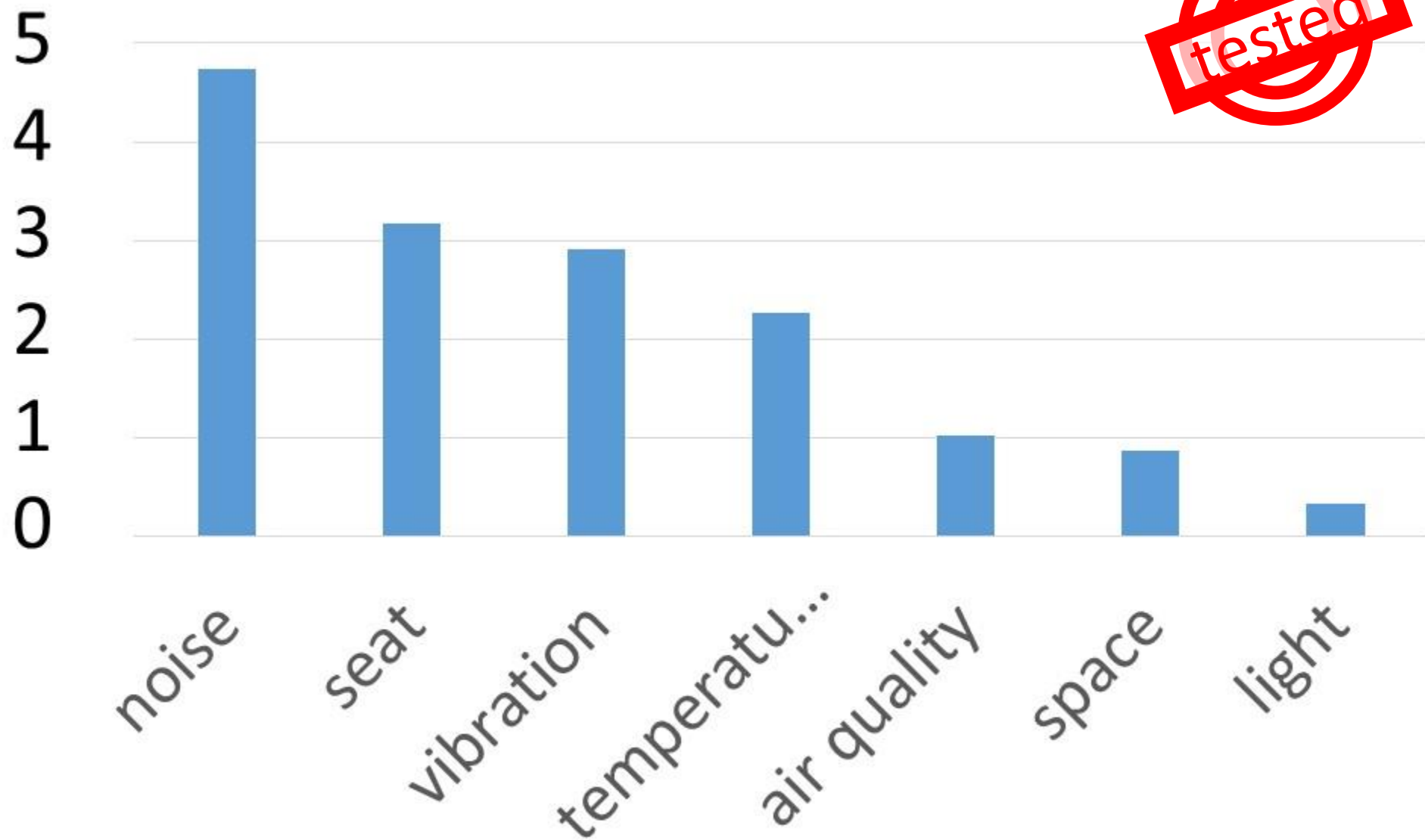


# 140 Minutes of Instrumented Test Flight

To understand the comfort perception of aircraft passengers

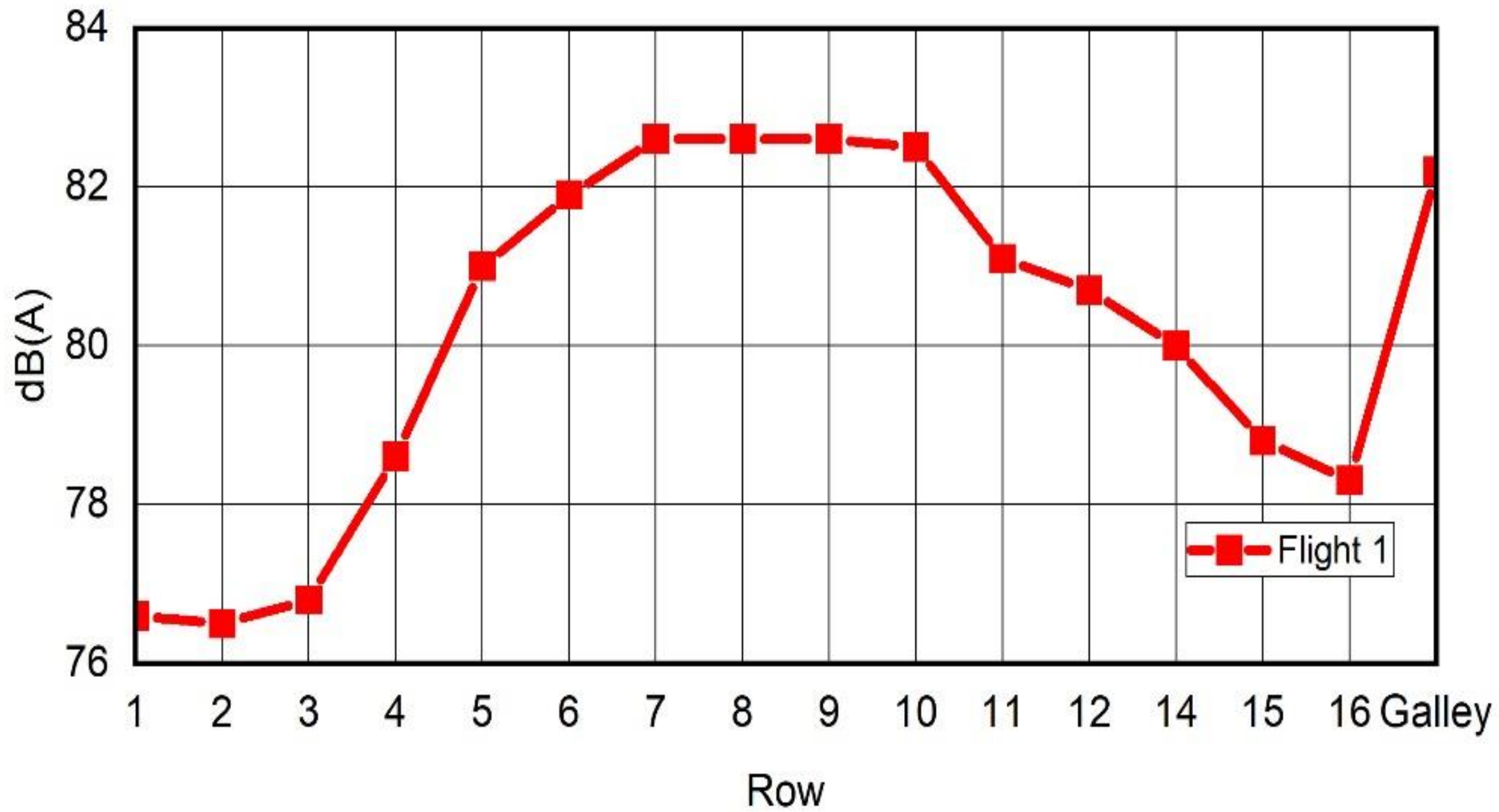


Importance for  
discomfort



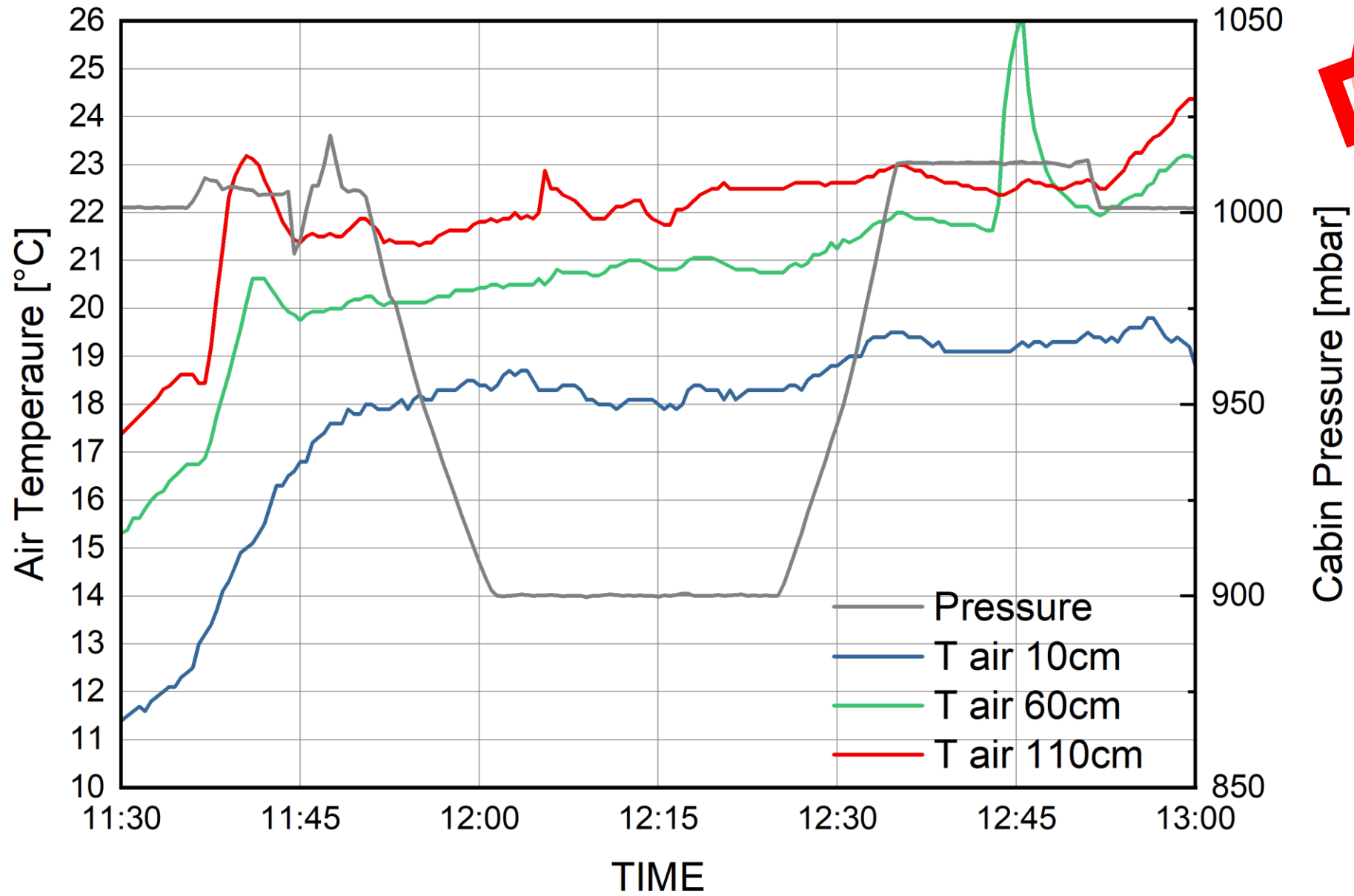
n=94, Vink et al., 2022







Will this reduce noise?



# Summary:

- AI guided pleasant boarding
- AI guided seat preference
- Staggered self forming seats
- Variation of posture
- Technology for sleep
- Noise cancellation
- Warm feet

**thank you for your attention**

