

Introduction

In warzones, exposure to extreme acoustic stimuli frequently coincide with exposure to psychological trauma. For combat veterans, hearing loss often accompanies psychological trauma responses to battlefield events [1]. Elevated acoustic startle and sensitivity to short, abrupt sounds is a well-known problem in veterans with psychological challenges after combat exposure, such as post-traumatic stress disorder (PTSD). When audiological problems align with sound sensitivity due to psychological challenges, less desired hearing aid adjustments (like decreasing gain) may be necessary. To address this comorbidity, intelligent features mitigating the impact of sudden sounds are needed. The P50 ERP component is frequently used to study startle reactivity in trauma-exposed populations [2]. Here, we tested the effect of transient noise management on the P50 in relation to acoustic startle in a group of Danish combat veterans.

- ## Methods
- N=13 Danish combat veterans (1 female), mean age 48 (30-63)
 - 6 NH, 7 reported exaggerated acoustic startle.
 - Mean no. deployments (of length ≈6 months): 2.4 (1-13)

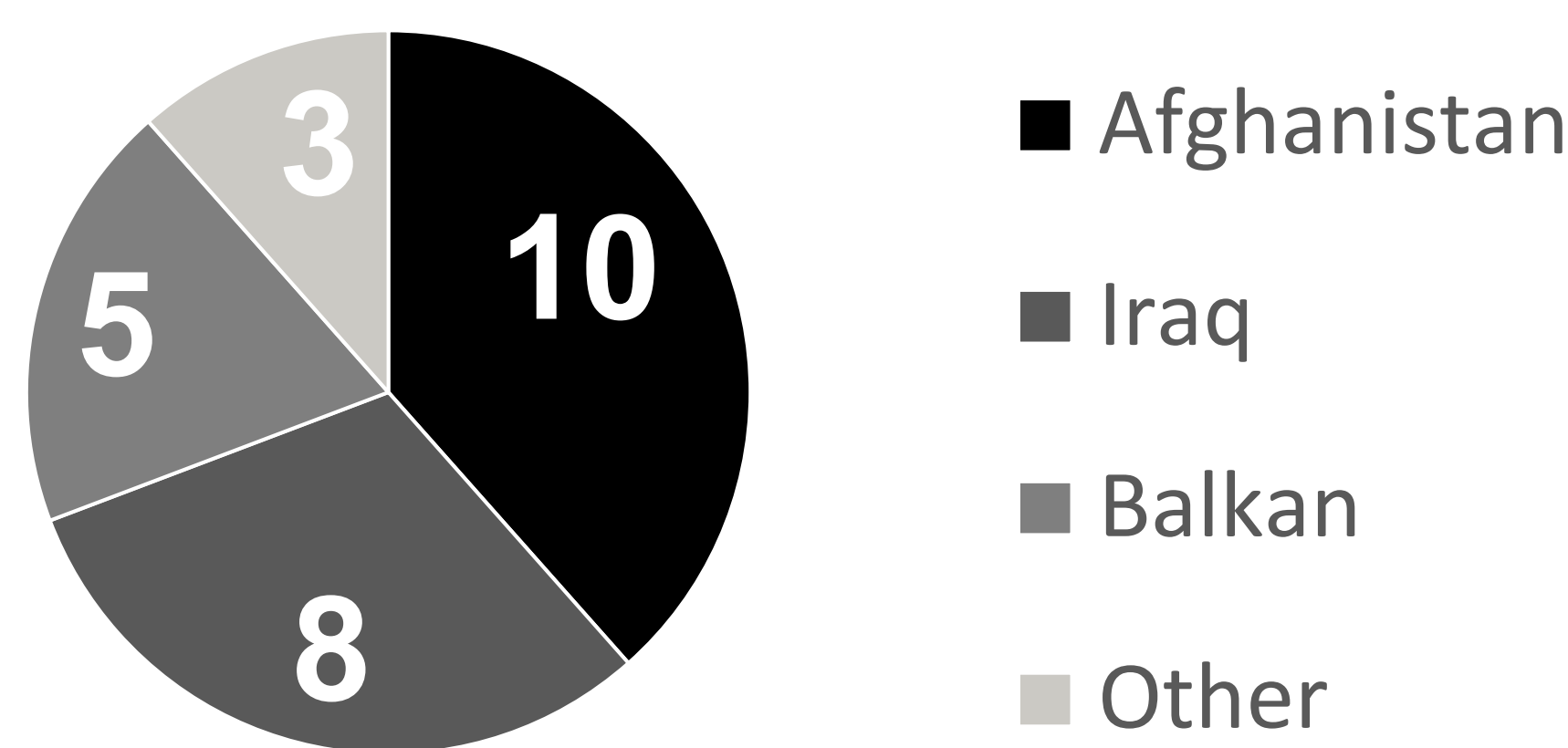


Figure 1: Deployment areas

- Task: Watch movie with low sound.
- Stimuli: paired white noise burst, 85 dB SPL, 15 ms presented frontally, behind and above visual display (141 cm)

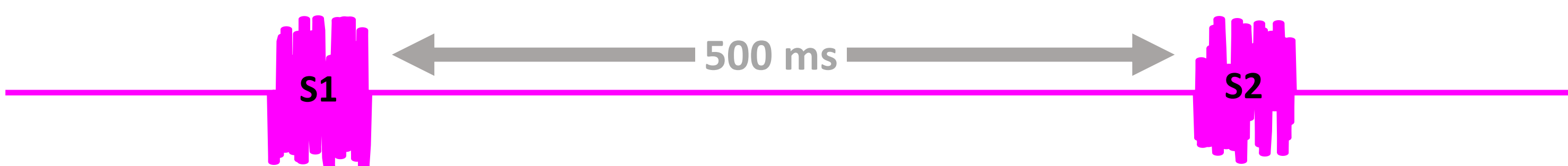


Figure 2: paired white noise burst stimuli

- Participants were fitted with Oticon Real to individual HL
- Comparison: Transient noise management system Oticon **SuddenSound Stabilizer** (SSS) OFF vs. ON (MAX)
- 6 blocks of 40 trials, 7.5-8.5 s inter-trial interval

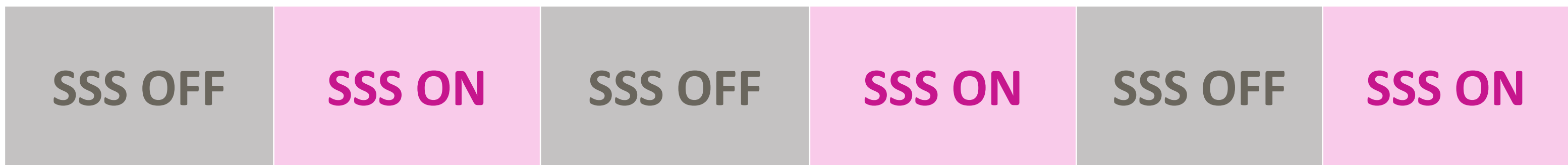


Figure 3: Block design of the experiment.

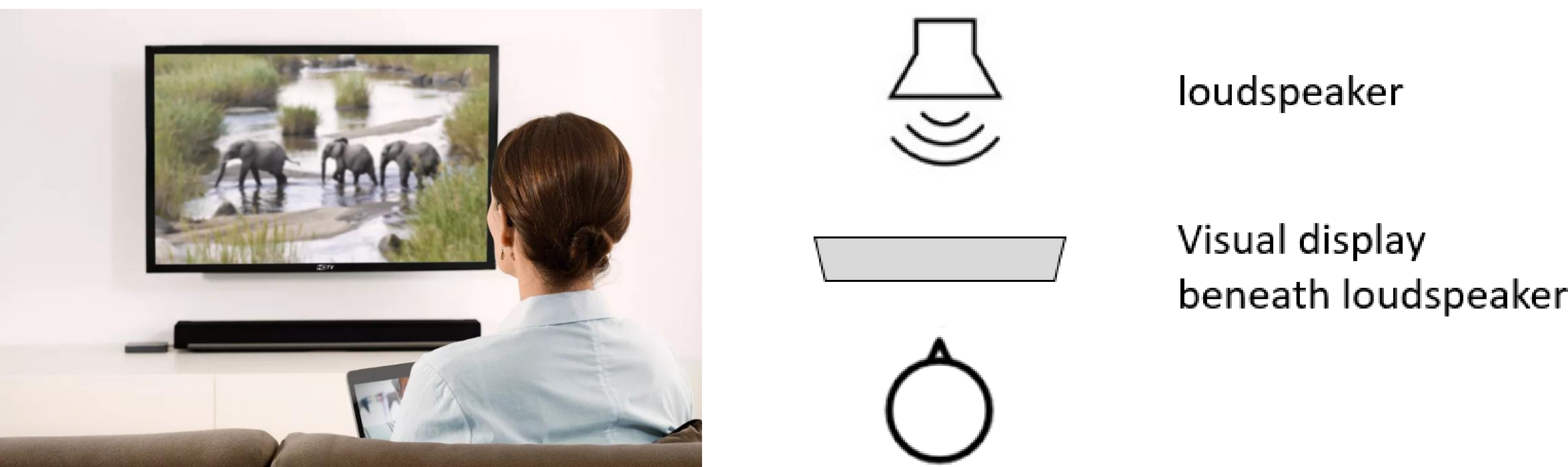


Figure 4: Experimental setup.

Results

ERP waveforms

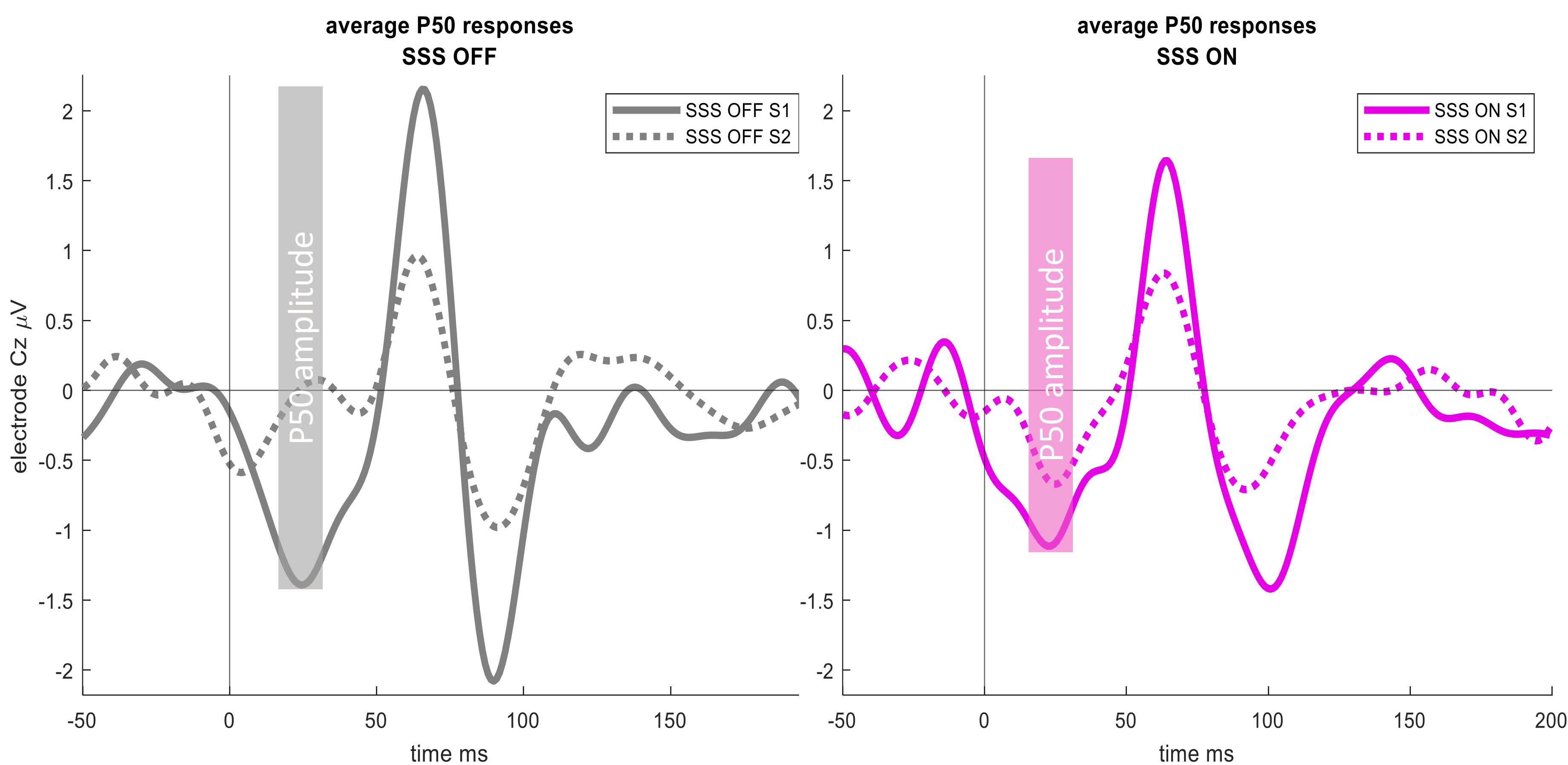


Figure 5: ERPs to S1 and S2 with SSS ON and SSS OFF

P50 responses

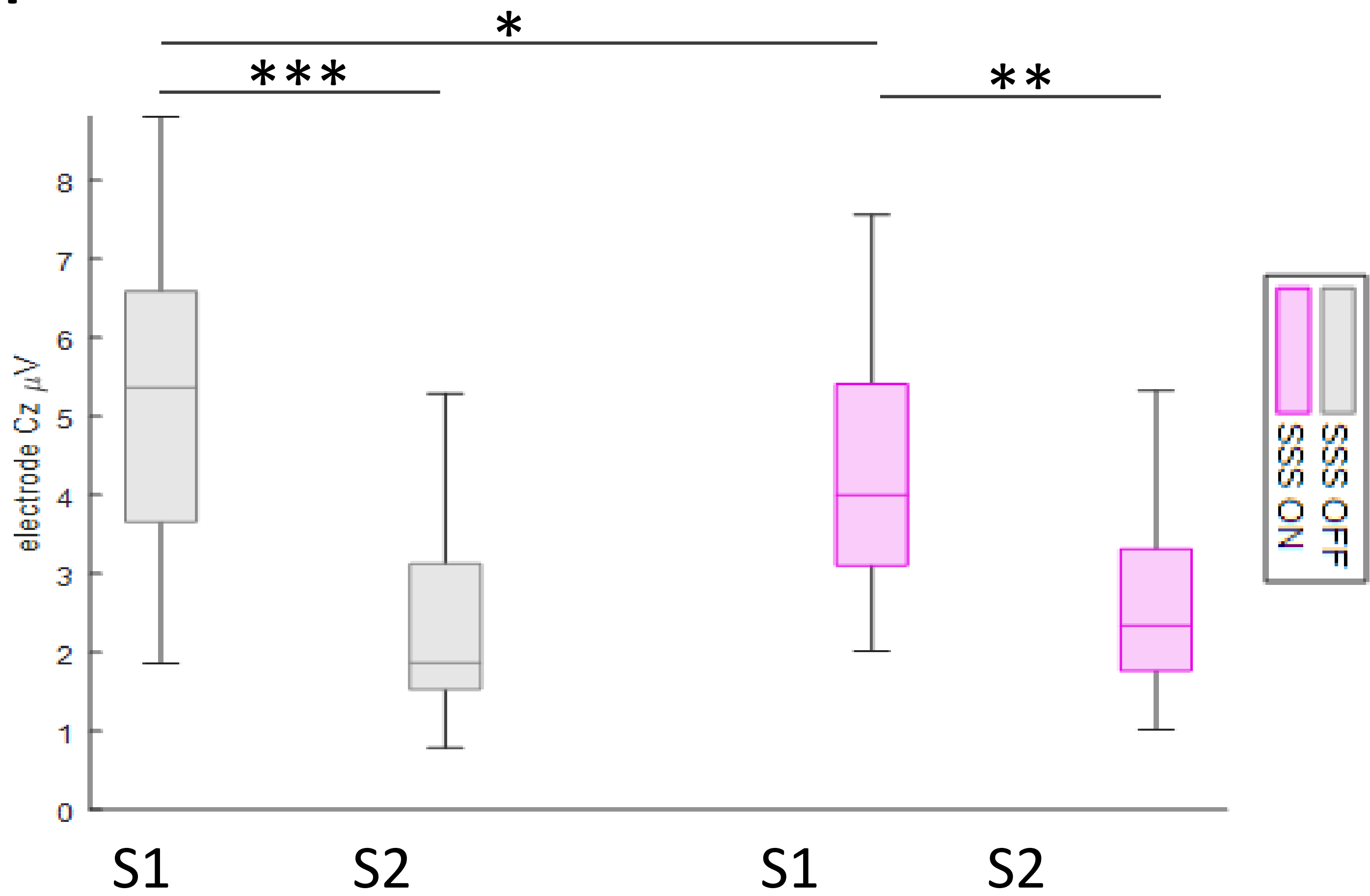


Figure 6: P50 amplitudes

Subjective responses

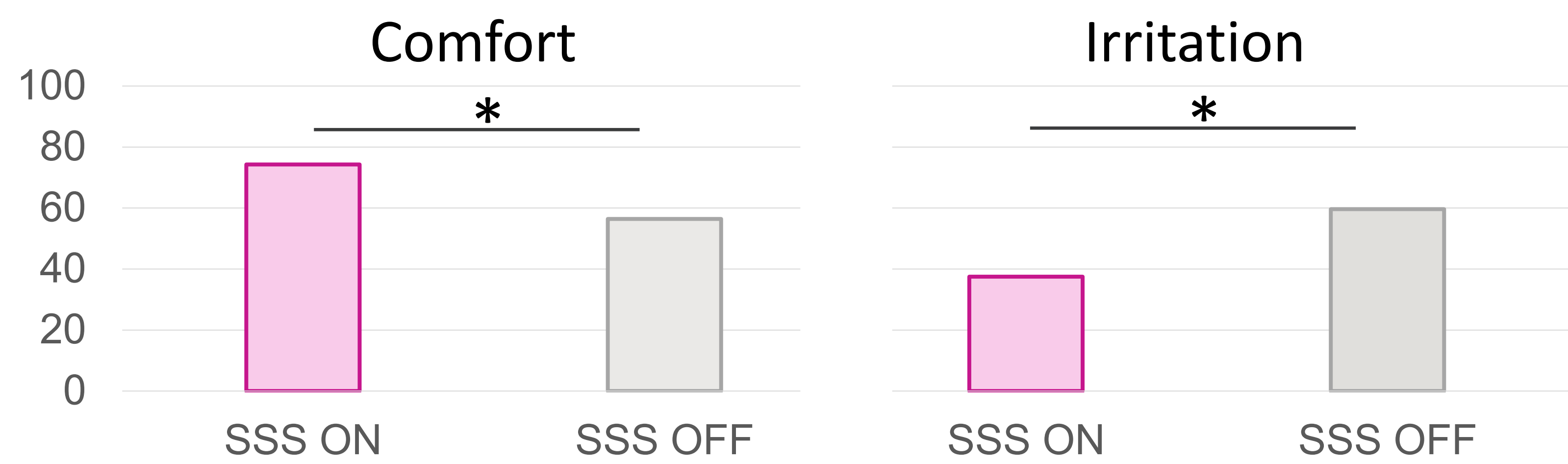


Figure 7: comfort and irritation ratings

Key findings

- SuddenSound Stabilizer significantly reduced P50 responses to transients in combat veterans
- Veterans reported greater comfort and less irritation with SuddenSound Stabilizer ON

Summary and conclusion

Combat veterans is a population that often present with combined audiological, psychological and neurological challenges. Sensitivity to sudden sounds, driven by psychological responses to combat trauma, may lead to less-than-optimal hearing aid adjustments. Our findings suggest that transient noise management such as Oticon’s SuddenSound Stabilizer may be able to reduce some of these obstacles, while being well tolerated by veterans.