

# USE OF NEUROFEEDBACK IN HIGHER MUSIC EDUCATION: A PILOT STUDY

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## BACKGROUND & AIM

Increasing the ability to concentrate is a frequently expressed need of students at music universities. The aim of the study was to investigate effects of neurofeedback on concentration during practice and stage performance.

## NEUROFEEDBACK

Neurofeedback is a type of biofeedback that focuses on the neuronal activity of the brain. The training method is based on reward learning (operant conditioning) where a real-time feedback provided to the trainee is supposed to reinforce desired brain activity or inhibit unfavorable activity patterns.

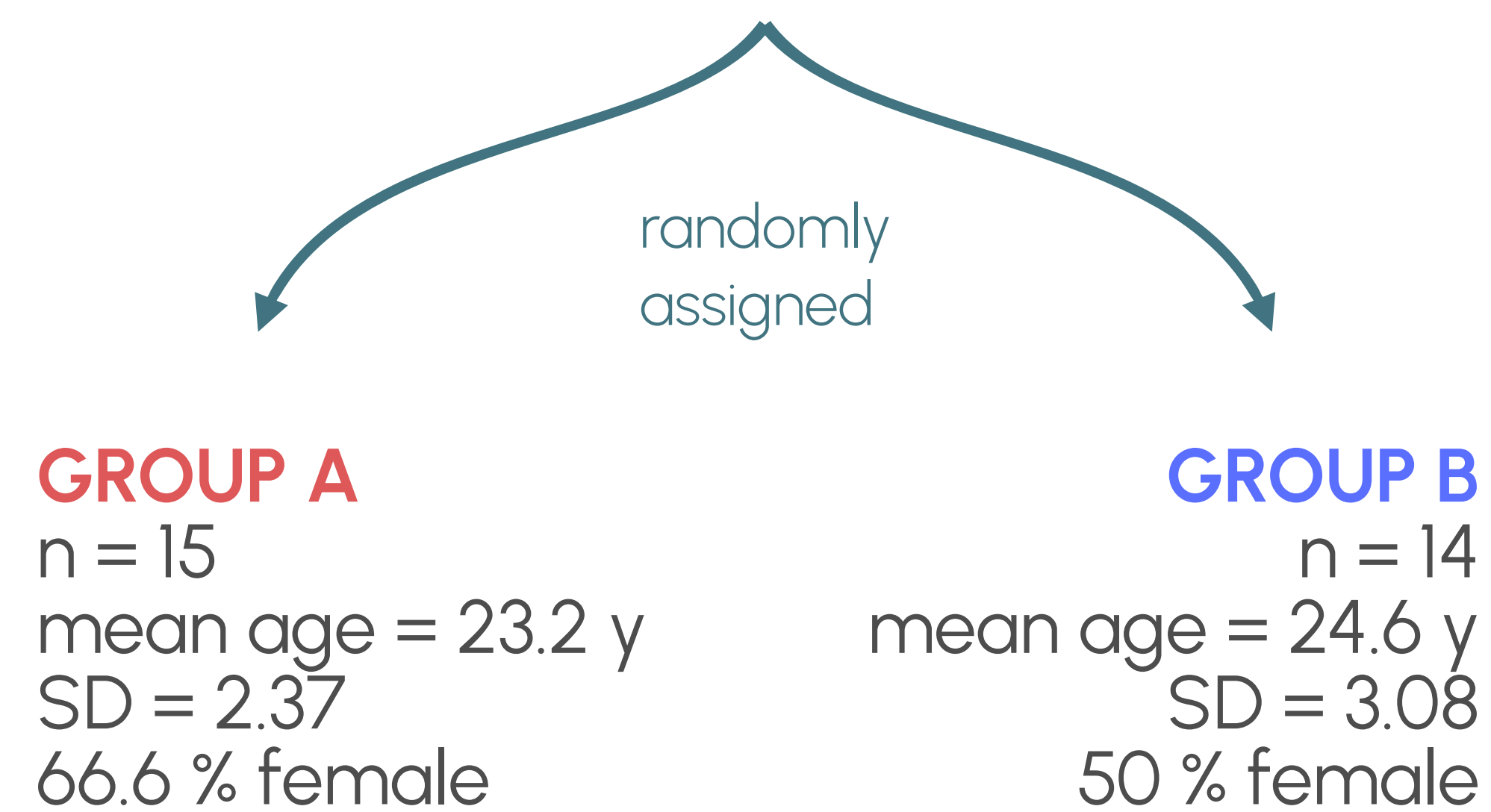


## TECHNOLOGY

The Study was conducted with muse® headbands, an additional electrode and tablets which used screen brightness changes as feedback.

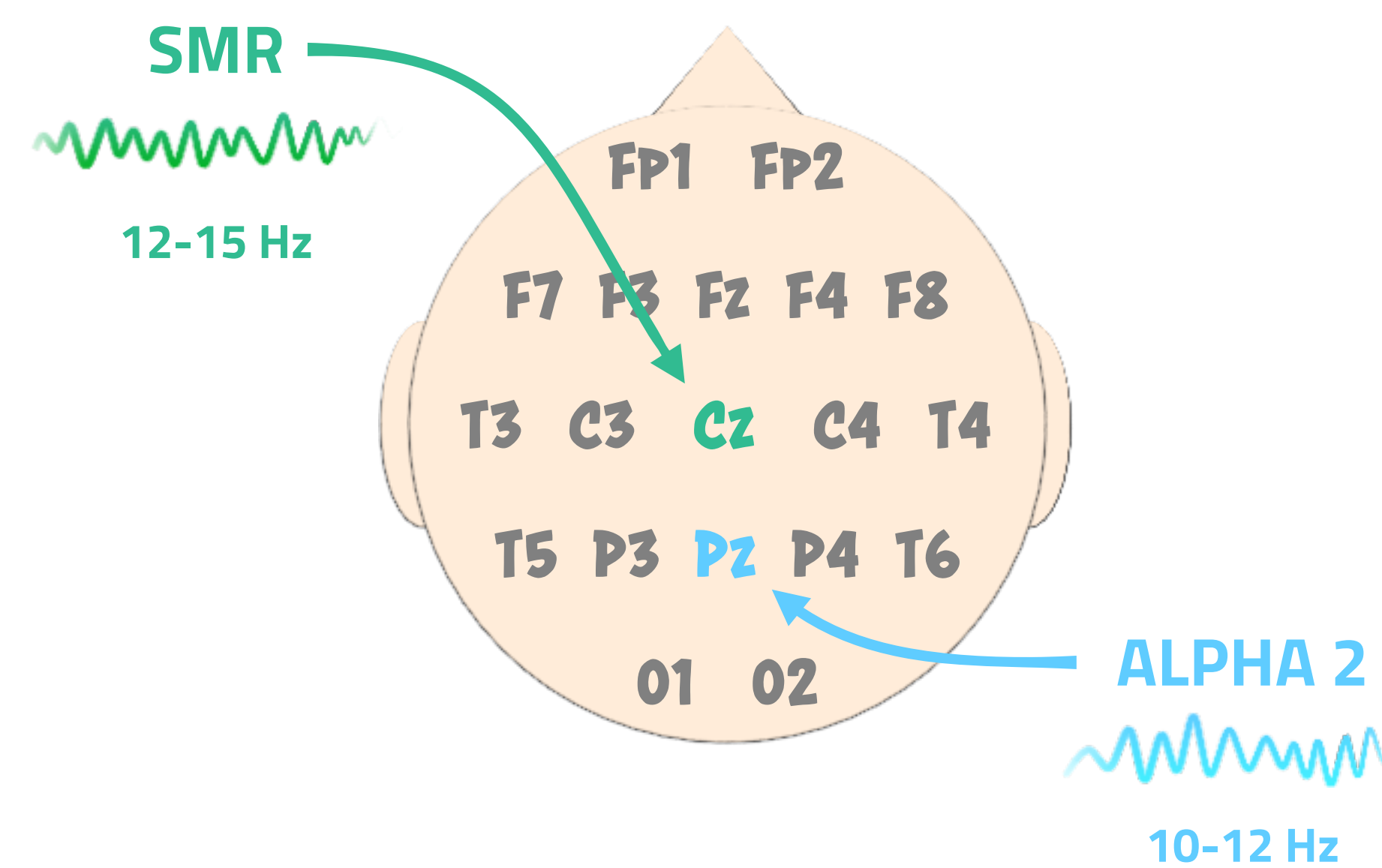
## 29 STUDENTS

SELECTED FROM SWISS MUSIC UNIVERSITIES



## INTERVENTION

Study participants completed 15 sensorimotor rhythm (SMR) training sessions at position Cz, 10 alpha training sessions at position Pz, and 5 further SMR sessions. The thresholds were adjusted automatically every 60 seconds aiming for a 60 % overall success rate.



## METHODS

At baseline (measurement time point T1), both groups were examined using quantitative electroencephalography (qEEG), visual analogue scales (VAS) and the Kenny Inventory (K-MPAI). Between time points T1 and T2, Group A completed 30 neurofeedback sessions over three months (no intervention in Group B). At T2, both groups were re-examined identically and group assignments were inverted until T3. Then, the groups were again examined in the same way and completed questionnaires six months post-intervention (T4) without qEEG.



## RESULTS

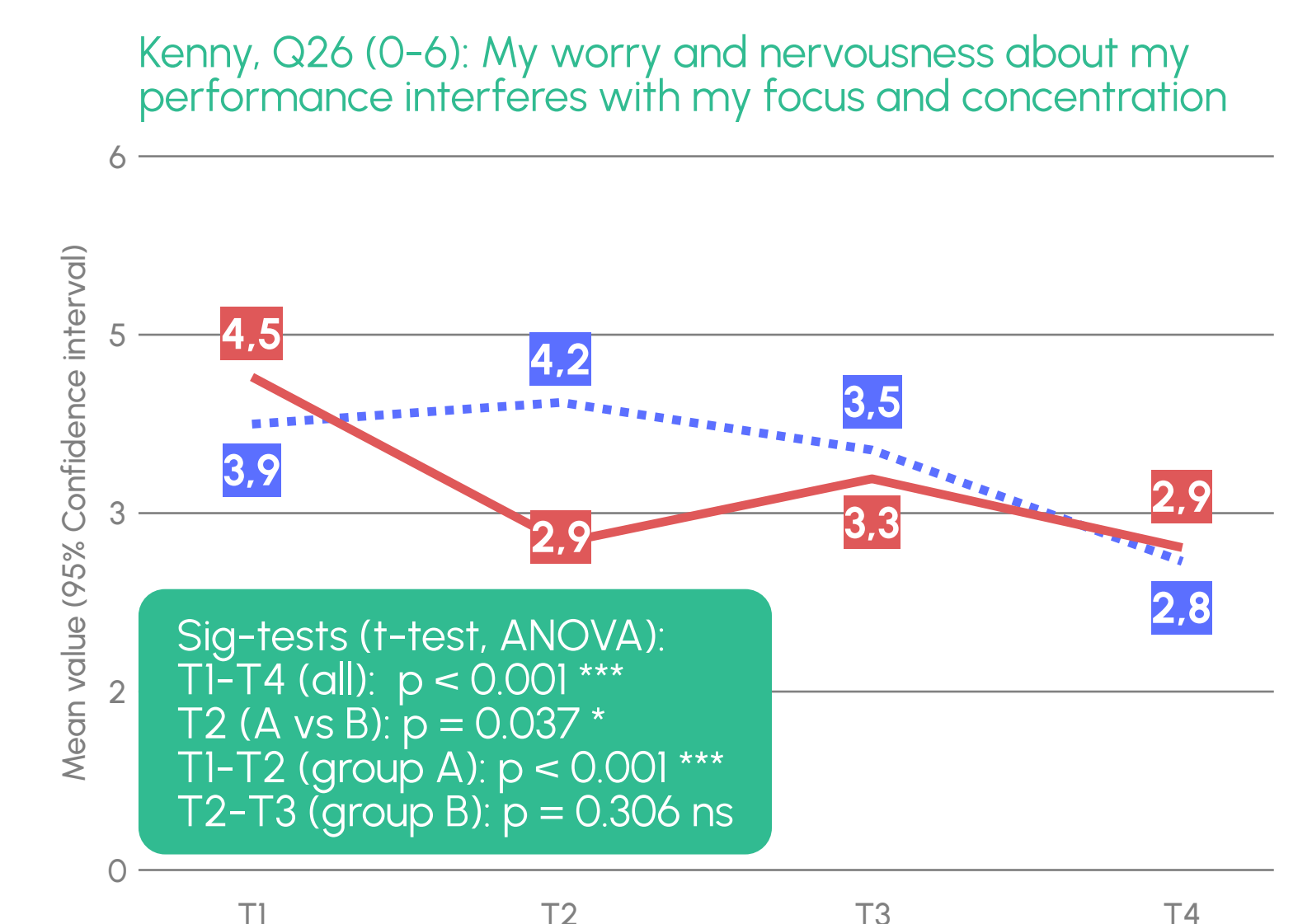
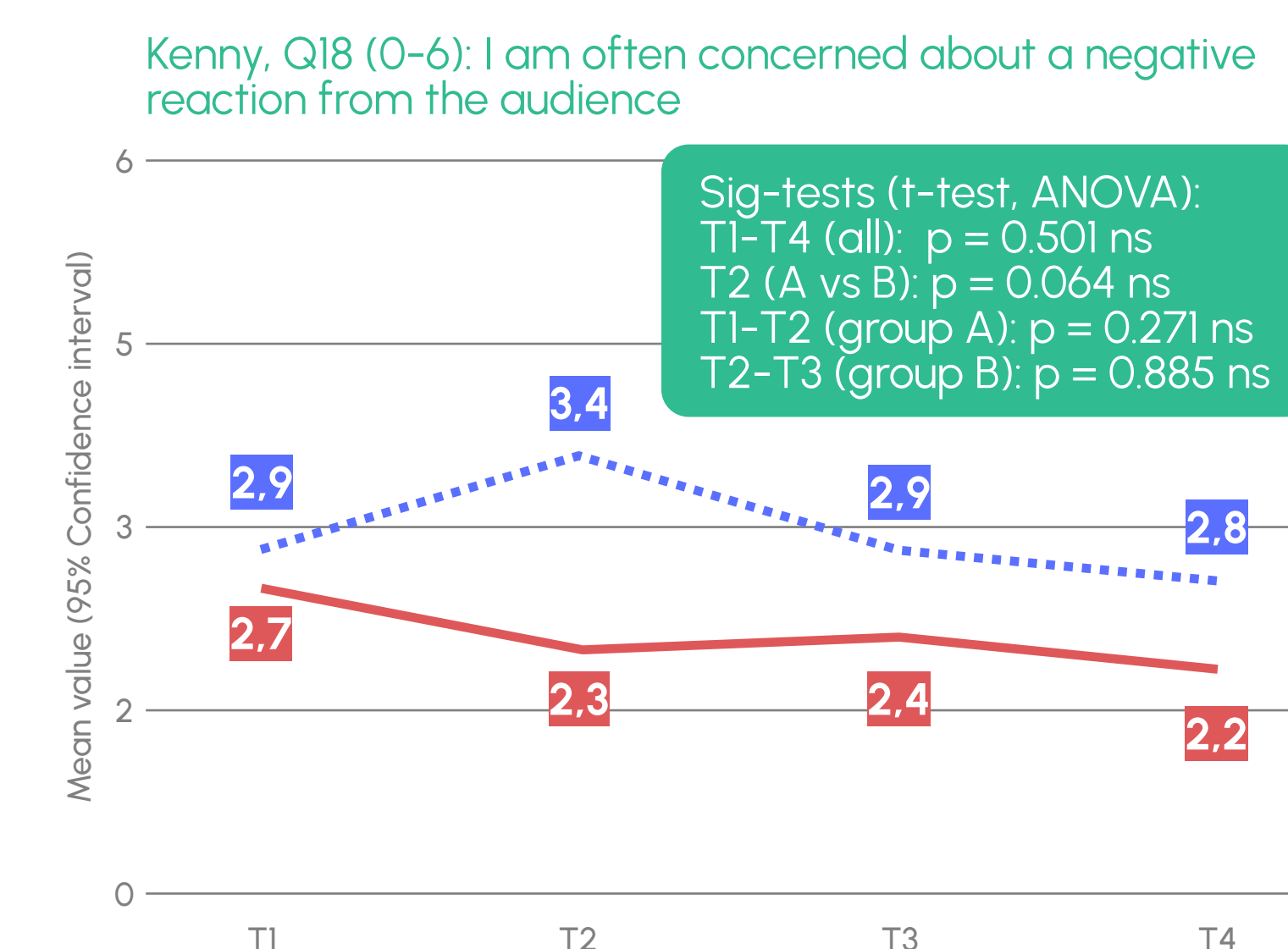
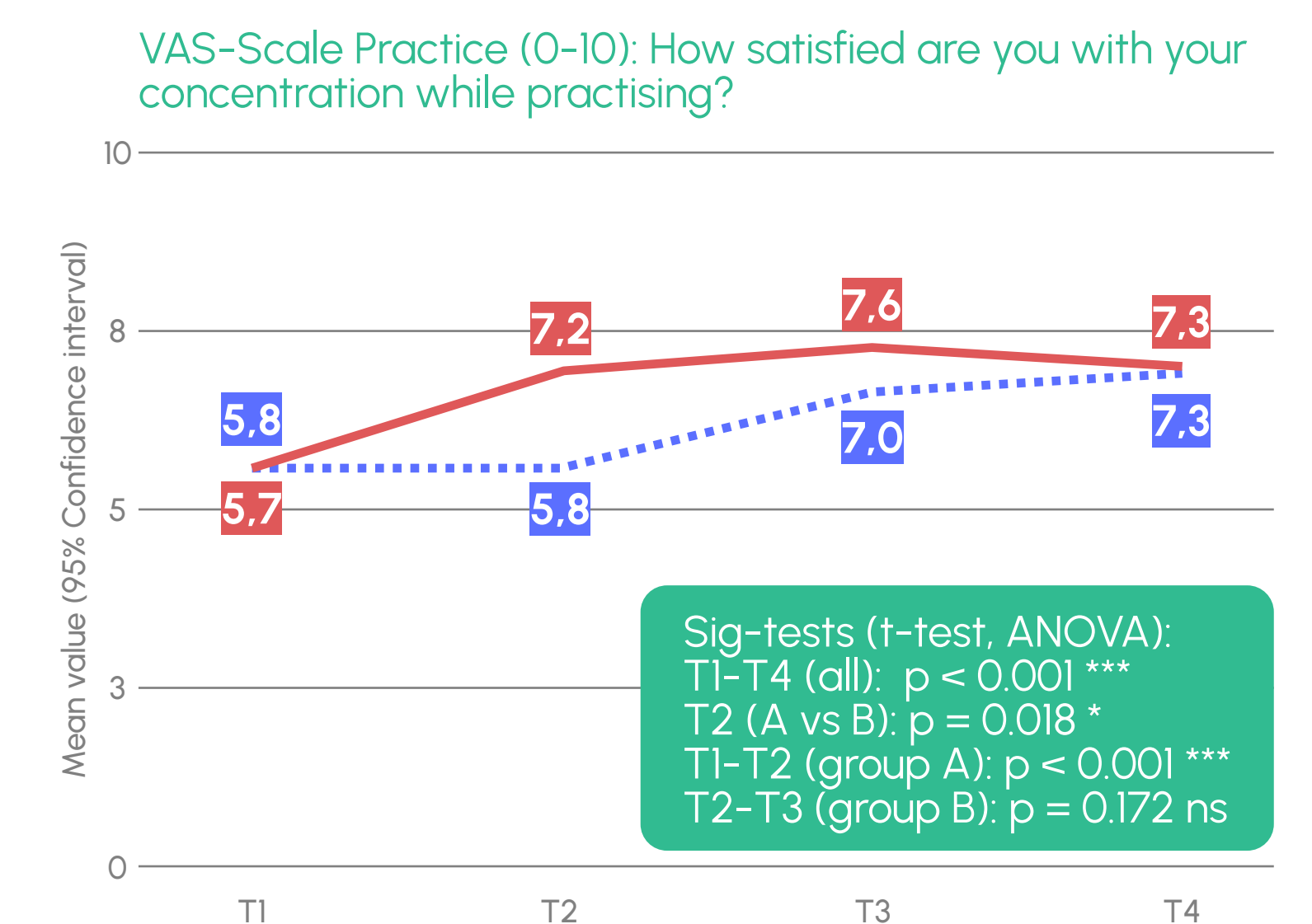
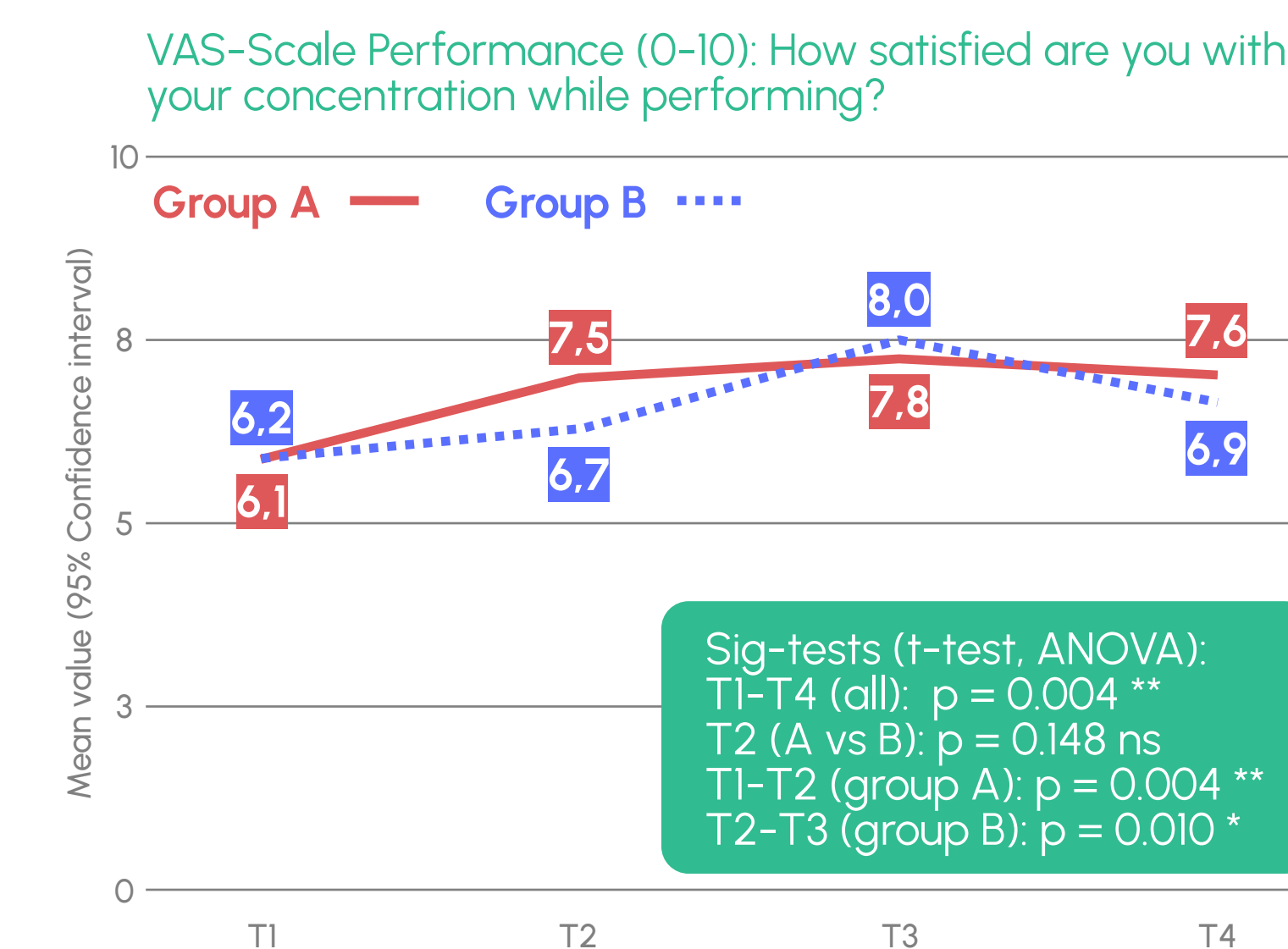
Groups A and B showed a significant increase in their mean scores on the VAS for concentration during practice ( $p < 0.001^{***}$ ) and stage performance ( $p < 0.01^{**}$ ) from T1 to T4.

There were interaction effects (time point x group) from T1 to T2 and T2 to T3 on the VAS and at the level of single items of the K-MPAI.

## CONCLUSION

Results of T4 suggest that the use of neurofeedback with the aim of improving concentration in music students is likely to be an effective tool.

Heterogeneous qEEG results (T1, T2, and T3) will need further in-depth analysis.



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