

Exploring the link between entrainment and altered states of consciousness by modulating the rhythmicity of long periods of drumming stimulation

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SCAN TO GET THE POSTER!



INTRODUCTION

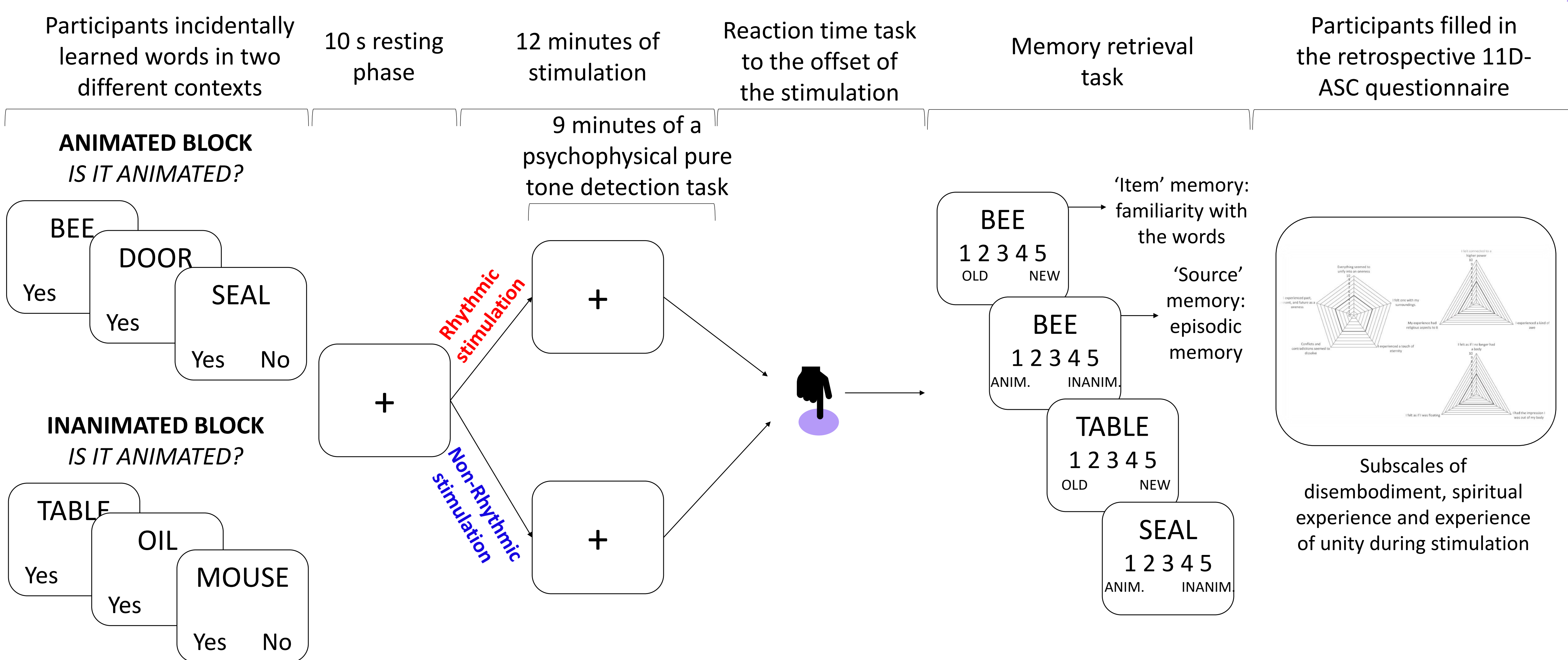
Music plays a pivotal role in all ritualistic contexts. Its sonic characteristics change depending on its function. In shamanic rituals, the **highly rhythmic and repetitive drumming** seems to be used to produce altered states of consciousness (ASCs) by facilitating a **dissociative state**¹. In this line, previous research has revealed an increment of the hearing thresholds induced solely by long periods of rhythmic stimulation in the delta frequency², evidencing the induction of a dissociative state. However, other aspects of cognition that may characterize rhythm-induced ASCs are yet to be investigated.

From a neuroscientific standpoint, various mechanisms have been proposed to explain how exposure to repetitive sounds can trigger ASCs, with particular attention given to **entrainment**, the brain's synchronization with periodic external stimuli³. However, the relationship between entrainment and ASCs has not been thoroughly explored.

AIM To explore the effects of rhythmicity on the induction of an altered state of consciousness and its relationship with entrainment.

METHODS

PROCEDURE: EXAMPLE OF AN EXPERIMENTAL BLOCK

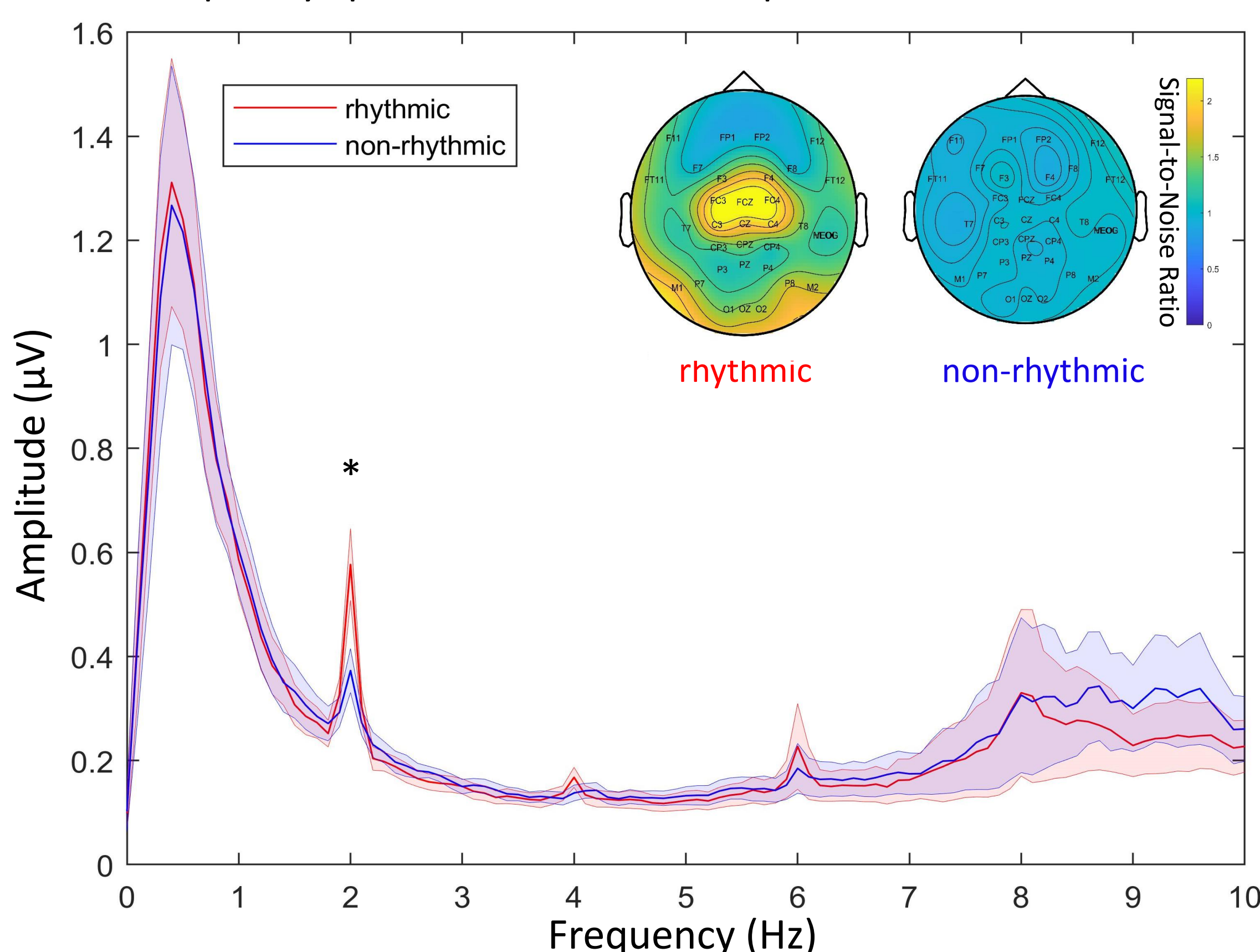


Participants (N=8) were stimulated with rhythmic and non-rhythmic stimulation in a repeated-measures design. A snapshot of the participants' cognitive function was obtained by measuring participants' hearing thresholds, absorption and memory performance. Participants' phenomenological experiences during the stimulation were measured with retrospective subscales. EEG was recorded from 34 electrodes.

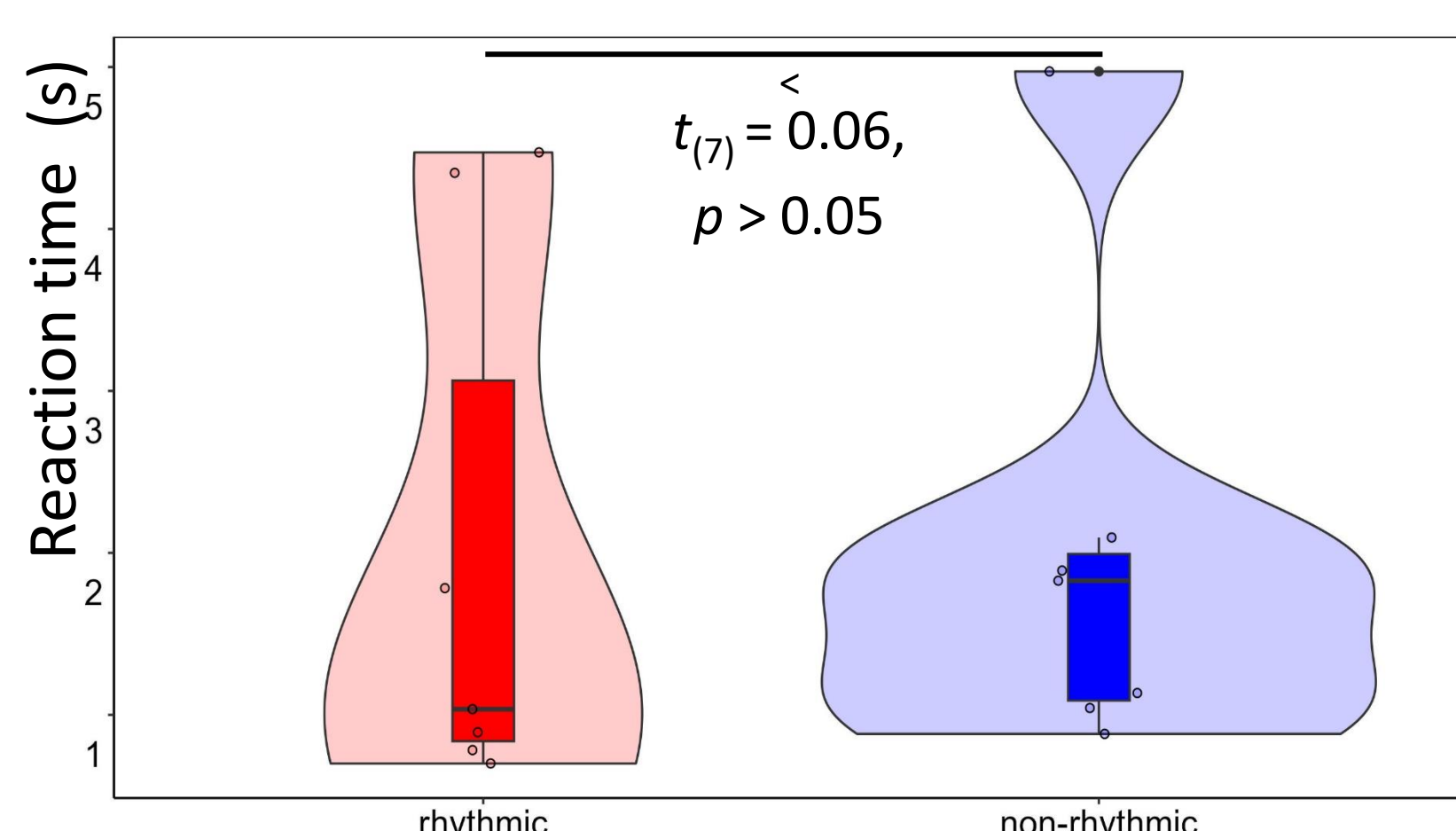
RESULTS

Rhythmic stimulation results in entrainment characterized by a fronto-central scalp distribution

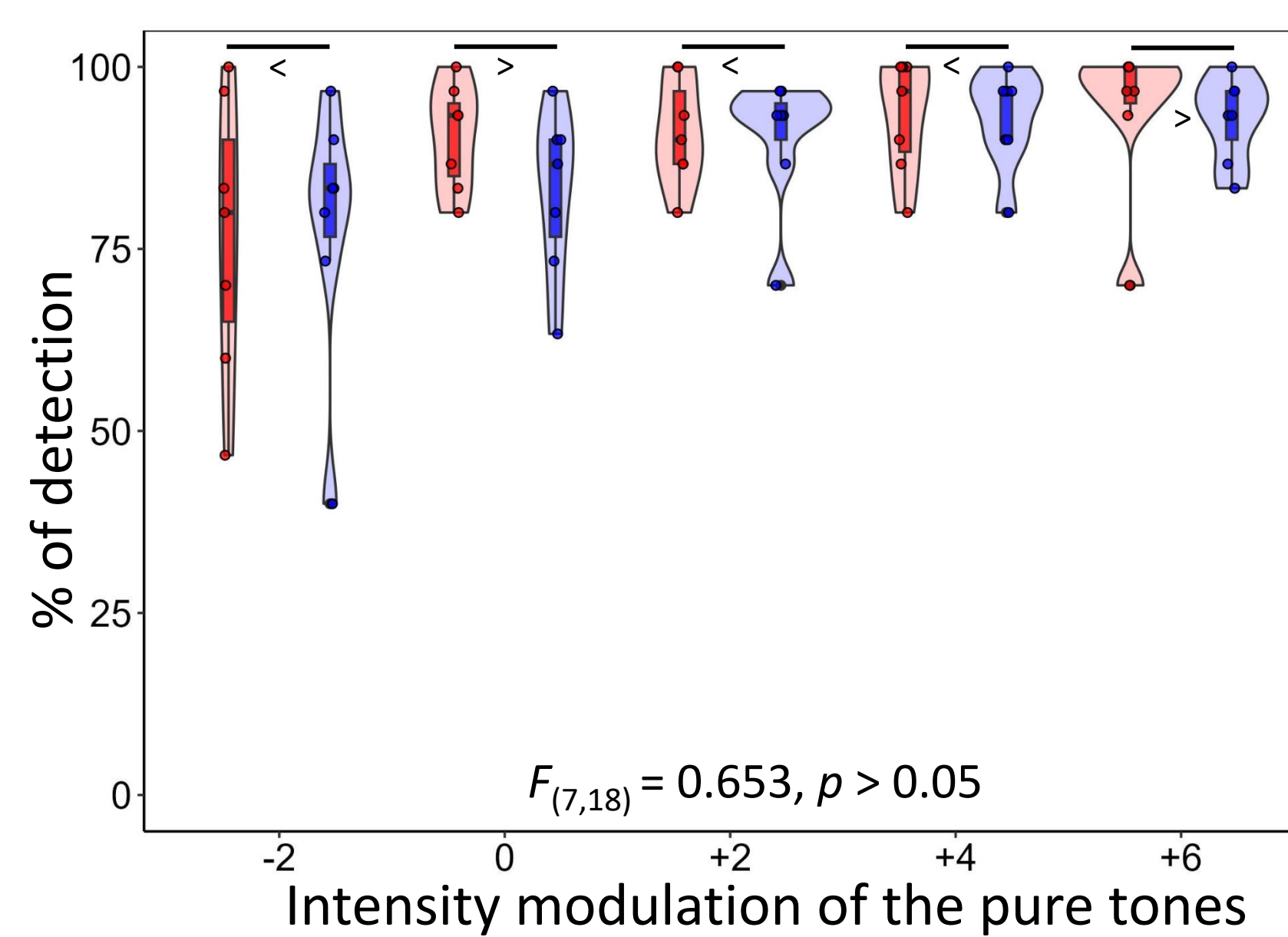
Frequency spectrum of the EEG response to the stimulation



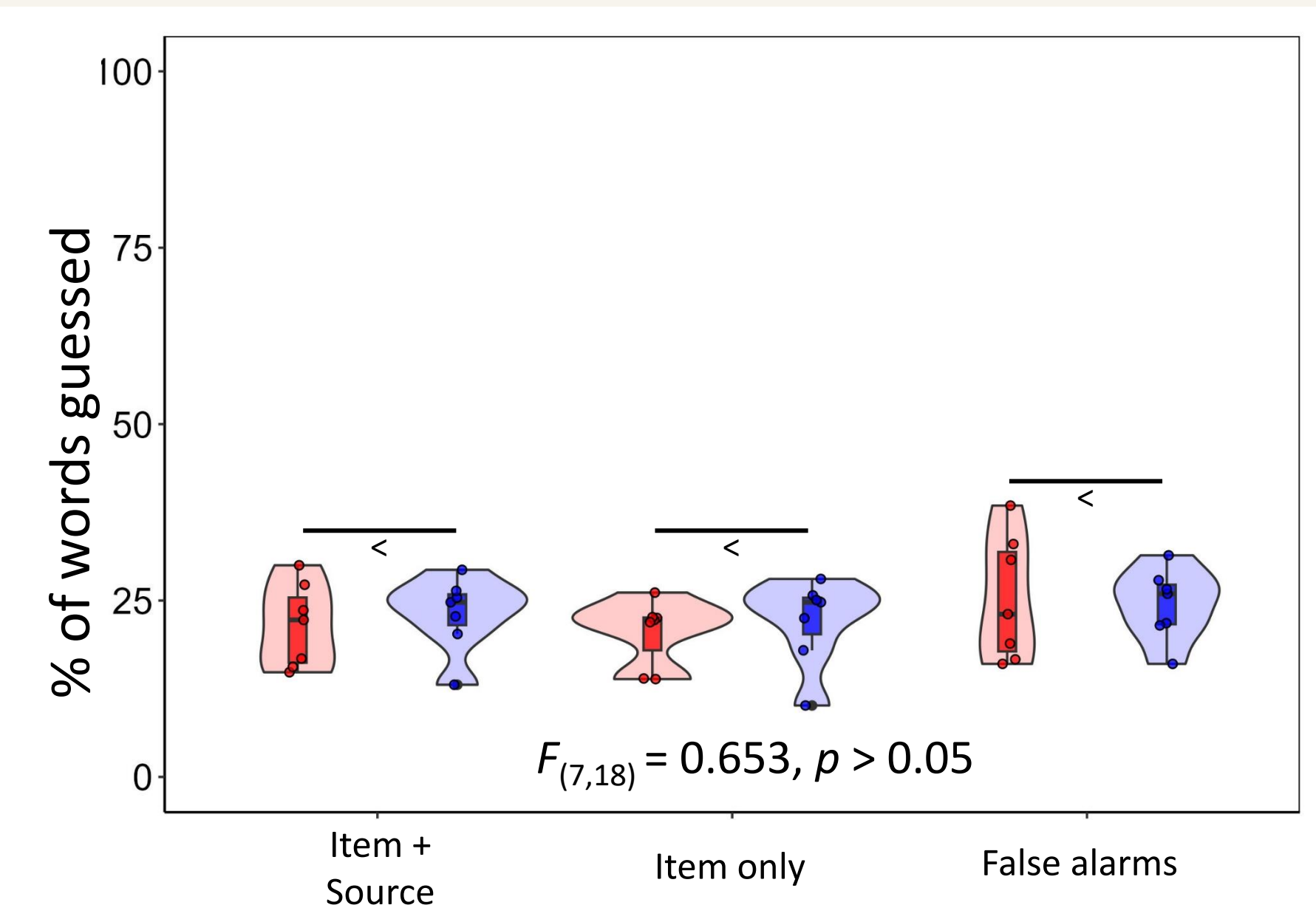
Participants react equally quickly to the offset of the rhythmic and non-rhythmic stimulation



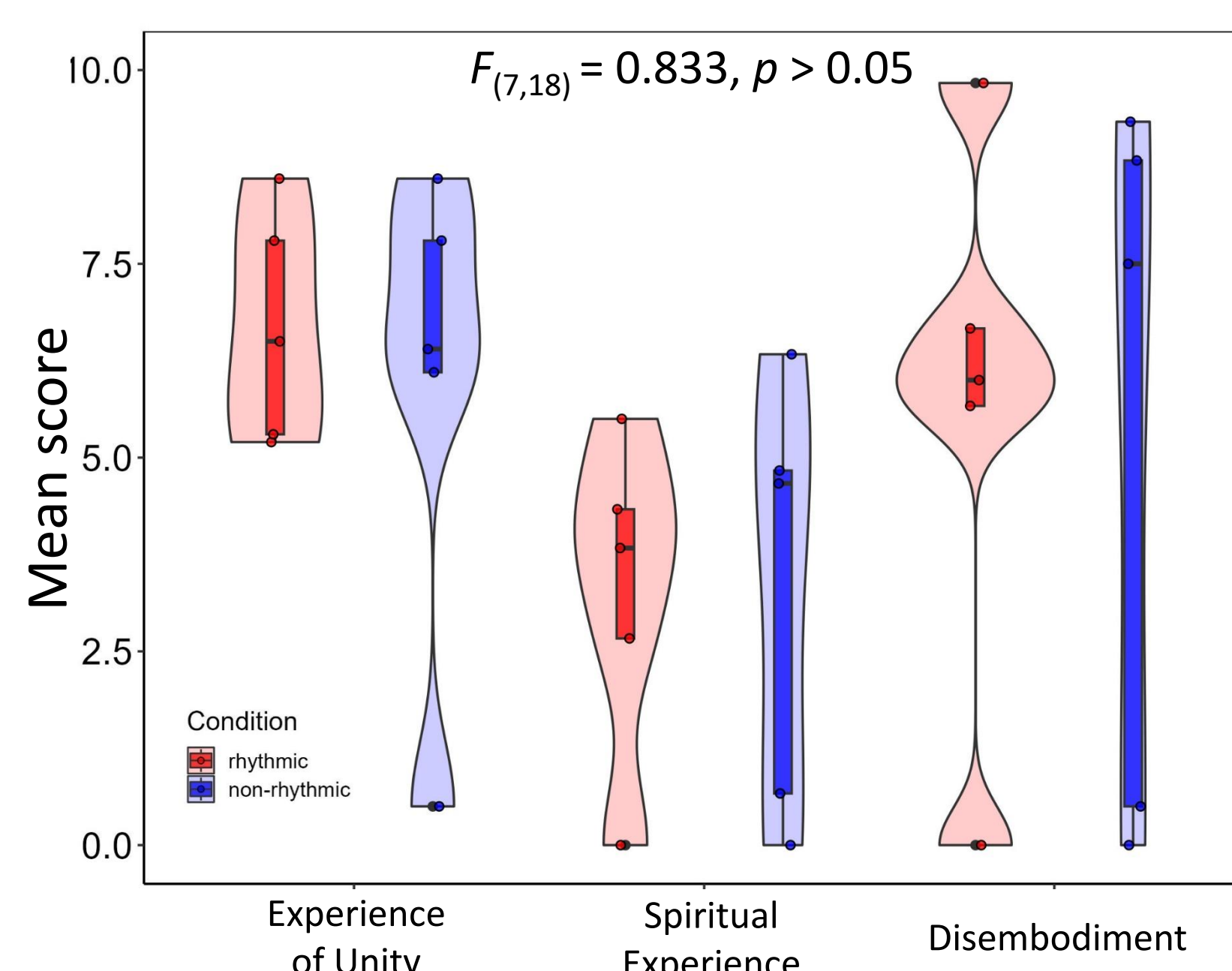
Participants show similar auditory thresholds during rhythmic and non-rhythmic stimulation



Participants perform the same in the memory task, irrespective of whether they received rhythmic or non-rhythmic stimulation



Participants exhibit comparable phenomenological experiences under both rhythmic and non-rhythmic stimulation



CONCLUSIONS

Rhythmic stimulation was effective in inducing entrainment. The preliminary statistical analysis did not reveal significant differences in most of the cognitive measures between rhythmicity conditions, suggesting that neither stimulation was effective in inducing an ASC. However, a larger sample size is needed to confirm such results. Further analysis will include testing the relationship between entrainment and each brain-behavior pair. We believe that our findings will bear relevance in the context of intensive care units, where patients often navigate complex neurological conditions and stand to potentially benefit from the effects of dissociative states mediated by external auditory stimulation.

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