



Title	Unconscious learning of auditory discrimination using mismatch negativity (MMN) neurofeedback
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## **Supplementary Information for**

### **Unconscious learning of auditory discrimination using mismatch negativity neurofeedback**

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#### **Cognitive strategies**

When the participants were asked how they made the disc size change after the BAD test on the last training day. The strategies each participant in the neurofeedback group reported to use were as follows:

Participant 1: "I tried to imagine that the solid green disc comes near to my eyes."

Participant 2: "I tried to imagine putting air in the green balloon (solid green disc)."

Participant 3: "I prayed that the solid green disc would enlarge all the time."

Participant 4: "I prayed that the solid green disc would enlarge all the time."

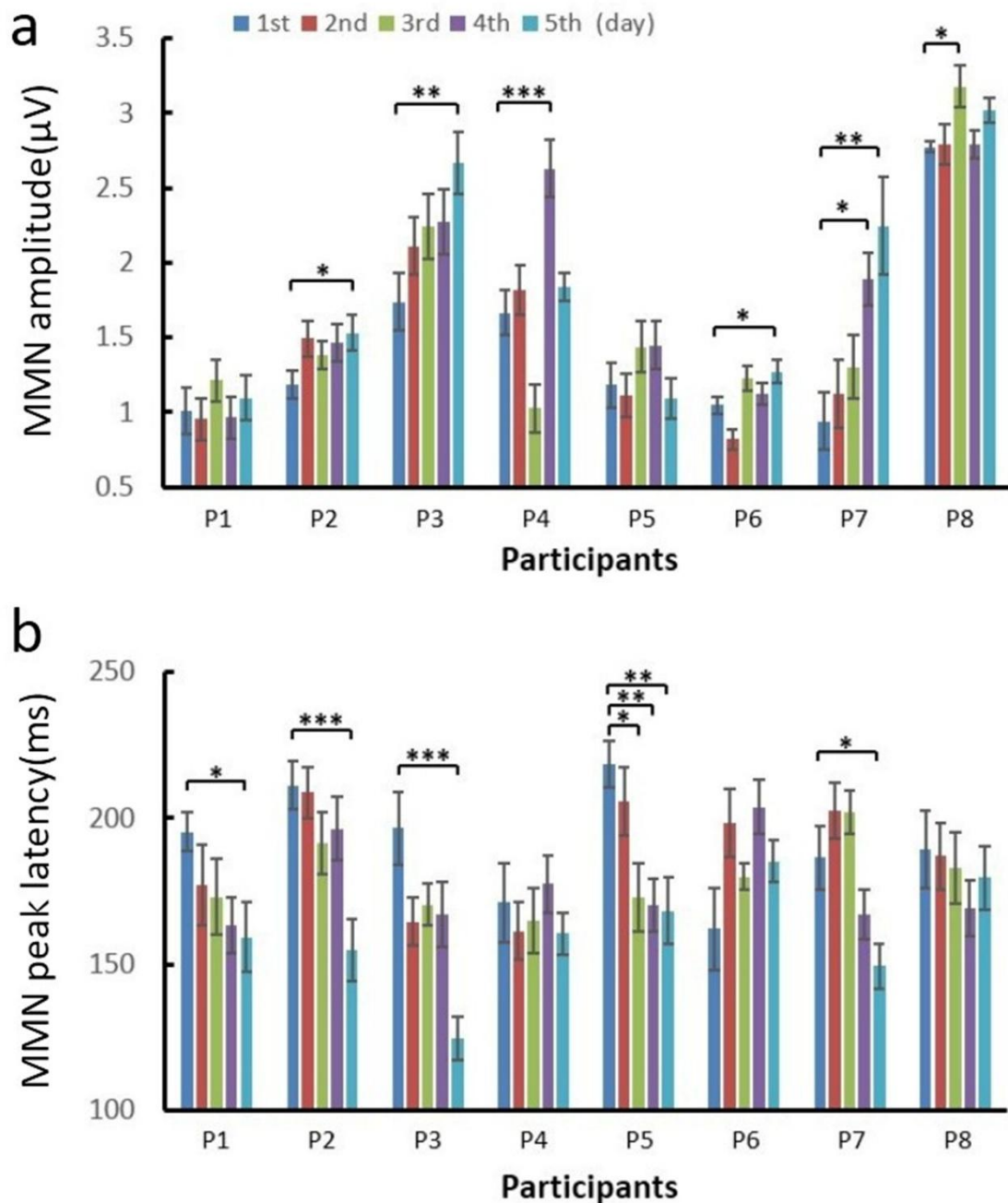
Participant 5: "I tried to imagine a bigger green disc than what I saw just now."

Participant 6: "I tried to imagine that enlarging the solid green disc was like pinching out on a smart phone."

Participant 7: "I tried to remember old memories or one scene about sports."

Participant 8: "I tried to focus my attention on the solid green disc and put energy into enlarging it."

Supplementary Figure S1



**Supplementary Figure S1:** MMN changes for individual participants in the neurofeedback group. (a) The MMN amplitude on each training day is shown for individual participants in the neurofeedback group. EEG data from 12 sessions on each training day were recorded to compute the MMN for each participant. Significant differences in amplitude between days were evaluated using a one-way analysis of variance (ANOVA) followed by Dunnett's test for multiple comparisons. Six of the eight participants exhibited a significant rise in MMN amplitude. (b) 5 of the 8 participants demonstrated a significant decrease in MMN peak latency. The error bars represent s.e.m. \* $P < 0.01$ , \*\* $P < 0.01$  and \*\*\* $P < 0.001$ , based on Dunnett's test in comparison with the first day. MMN, mismatch negativity.