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Effects of short-term training on attentional modulation of neural phase

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ABSTRACT

How does the brain follow a sound that is mixed with others in a noisy environment? One possible strategy is to allocate attention to task-relevant time intervals while suppressing irrelevant intervals - a strategy that could be implemented by aligning neural modulations with critical moments in time. Here we report results from several experiments demonstrating that selective attention to temporally interleaved non-verbal tone streams is linked to phase shifts in EEG activity at the rate of within-stream tone presentation. This paradigm provides an implicit measure of non-verbal selective attention which strongly correlates with performance in both adult and school-aged populations. Moreover, we find that attentional modulation of neural phase is stronger in trained musicians and can be enhanced by as little as two hours of online selective attention training. These results suggest that phase timing is a robust and reliable marker of individual differences in auditory attention and demonstrate the possibility of rapid short-term plasticity in the mechanisms of selective auditory attention. Finally, we present pilot data relevant to the question of whether short-term training programs can be a successful remediation strategy in populations who struggle to control attention.

Keywords: attention, EEG