

Meditation-induced changes in temporal processing are mediated by heart-rate and breathing variability

ABSTRACT:

The study was based on conceptualizations pertaining to the relationship between meditation, the subjective present, and psychophysiology. We aimed to assess whether physiological changes of heart rate and breathing rate during meditation would influence the timing of perceived events. We employed three psychophysical tasks related to perception of sequence, the integration of metronome beats, and the perception of the Necker cube. The tasks were administered before and after the intervention. Participants were experienced mindfulness meditators who in three separate 10-minute sessions, conducted on three separate days, either meditated by following a meditation session (n=44) or listened to an audio play (n=47). During the intervention heart-rate and breathing rate were recorded and compared to a resting-state condition. Regarding the switching of the Necker cube, breathing rate significantly mediated the effect of meditation across all participants: the slower the breathing during meditation, the slower the switches of the two aspects of the Necker cube. Regarding the metronome task, and over all frequencies, meditation in more experienced meditators (n > 100 hours) lead to a decrease of the duration of integration intervals. For the fastest (ISI = 0.3 s) and slowest (ISI = 3 s) metronome frequencies, an indirect effect occurred: the larger heart rate variability, the larger the integration interval. These findings add evidence to meditation-induced changes in subjective time and the embodiment of mental functioning. The direct effect of smaller integration intervals in the metronome task is indicative of a more pronounced present-moment focus characteristic of deep meditative states.

Keywords

Mindfulness meditation, Present moment, Necker cube, Metronome, Sequencing

Published Work:

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