MEDITATION-INDUCED NEUROPLASTICITY OF THE EMBODIED-SELF AND ITS ROLE IN SOCIAL PROCESSING

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Grant 93/18

Background: The embodied sense of self is usually understood as a basic feature of consciousness and involves a sense of agency, ownership and 1st person perspective. Currently, there is no consensus if states of consciousness devoid of such features are possible at all, let alone their potential benefits. Previous research indicates that deep meditative states might be a suitable candidate to investigate these questions.

Aims: The aims of the currents study were: a) to map the neurophenomenology of malleability of the embodied self in meditation b) to study the relationship between meditation, embodied self-flexibility and social processing.

Method: Forty-six long-term meditators underwent a 3-weeks meditative training of embodied-self flexibility. Subsequently, they underwent a lab session including magnetoencephalography (MEG) measurement during rest, meditative states of dissolved and meditative states of maintained self-boundaries. In a second lab session, meditators as well as a group of matched controls completed a series of social processing tasks measuring facial emotion recognition, behavioral response bias to the self, implicit ingroup bias and empathy.

Results: SB dissolution states were characterized by changes in six experiential features including the sense of location, agency, first-person perspective, attention, body sensations and affective valence, as well employed meditative technique and overall degree of dissolution. Quantitative analyses of these features highlighted a unitary dimension of boundary dissolution. Notably, passive meditative gestures of “letting go”, reducing attentional engagement and agency, drove the depth of dissolution. Neurophysiologically, boundary dissolution was characterized by broadband decreases in oscillatory power, which peaked in a high beta range and were localized to medial and parietal regions. These reductions were more pronounced in phenomenologically deeper states of dissolution. Preliminary analyses of behavioral data indicated differences between the meditation group and controls in emotion recognition, self-bias and ingroup bias. In future analyses these effects will be related to neural and phenomenological dissolution measures.

Conclusions: The results demonstrate that states of strongly diminished embodied self-experience can be produced reliably in meditation, and that suspension of active attentional engagement is a key process in such states, mirrored by reductions in parietal beta power.

Keywords: self, meditation, magnetoencephalography, neurophenomenology.

Publications:

Berkovich-Ohana, A., Dor-Ziderman, Y. Trautwein, F-M., Schweitzer, Y., Fulder, S., Nave, O., & Ataria, Y. (2020). The hitchhiker's guide to neurophenomenology - Examples from studying self-boundaries with meditators. *Frontiers in Psychology – Consciousness Studies*, 1-19, (Special issue: Integrating Philosophical and Scientific Approaches in Consciousness Research). https://doi.org/10.3389/fpsyg.2020.01680

Nave, O., Trautwein, F.-M., Ataria, Y., Dor-Ziderman, Y., Schweitzer, Y., Fulder, S. & Berkovich-Ohana, A. (2021). *Self-Boundary Dissolution in Meditation: A Phenomenological Investigation. Brain Research*, 11(6), 819; https://doi.org/10.3390/brainsci11060819.

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