



“Advanced meditators: experimental and experiential perspectives”

Day: Wednesday 11th July 2018 Time: 10.45 am – 12.00 pm Track: Working Mechanisms

The study of experienced meditators and their capacity to sustain focused attention, regulate their emotions, transcend suffering and obtain enlightenment and process aversive stimuli differently has been getting increased attention. In this symposium regarding advanced mediators, the first presenter will talk about an electroencephalographic (EEG) study that investigates the modulation of pain experience by focused attention meditation (FAM), open monitoring meditation (OMM) and loving kindness meditation (LKM) in long-term meditators. The second presenter will discuss the systematically explored different components of attentional control (including emotional regulation) using a combination of behavioural and electrophysiological measures. The third presenter will explore the construct of spiritual enlightenment and essentials of enlightenment experience among advanced meditators from different cultural backgrounds. The last presenter will discuss the results of an experimental study that examined whether meditation experience could account for variations in the processing of aversive stimuli via differences in thought accessibility and mnemonic neglect.

Symposium overview

Presenter 1 **Antonino Raffone** - The effects of focused attention, open monitoring and loving kindness meditation on pain experience and its electroencephalographic correlates in Theravada Buddhist monks

Presenter 2 **Leigh Riby** - Behavioural and electrophysiological markers of attentional control and emotional regulation in expert meditators.

Presenter 3 **Qi Wang** - Advanced Meditators' Lived Experience of Enlightenment Moment: A Phenomenological Study of The Mechanisms of Suffering Transcendence

Presenter 4 **James Walsh** - Mindfulness practice, dispositional mindfulness and the processing of aversive stimuli

Chair: ***Antonino Raffone***



The effects of focused attention, open monitoring and loving kindness meditation on pain experience and its electroencephalographic correlates in Theravada Buddhist monks

Antonino Raffone, et al.

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In our electroencephalographic (EEG) study we originally investigate the modulation of pain experience by focused attention meditation (FAM), open monitoring meditation (OMM) and loving kindness meditation (LKM) in long-term meditators. Moreover, our study bridges first- and third-person measurements by including phenomenological reports, on a trial by trial basis, of the dimensions of experience pain intensity, aversion (drive to avoid the pain) and identification (self-involvement or feeling the experience as “my pain or my feeling”). 20 Theravada Buddhist monks and novices of the Thai Forest Tradition and 20 matched control participants with short-term meditation experience (with 50 to 200 hours of meditation practice) took part in our study. A non-meditative rest condition was alternated with FAM, OMM and LKM meditation forms in both groups of participants during electrical pain stimulation. The whole experimental procedure consists of three phases: 1) absolute pain threshold, 2) stimulus intensity calibration; 3) task and stimulation blocks. The data analyses are in progress. Preliminary event-related potential (ERP) analyses have been conducted in the group of long-term meditators (monks). The statistical design included three within subjects variables: Condition (4 levels corresponding to the 4 states of rest and the 3 forms of meditation), Region (4 levels corresponding to frontal, fronto-central, central and centro-parietal groups of electrodes) and Laterality (5 levels corresponding to left lateral, left medial, midline, right medial, right lateral electrode positions).

The results from the N1 ERP component reveal two major effects in the long-term meditators:

1. pain-related N1 amplitude is reduced contra-laterally to the side of pain stimulation;
2. the state of meditation additionally reduces the amplitude of N1 at frontal sites. Both amplitude and latency results point to a specific modulation of pain processing during the OMM meditation. Moreover, in long-term meditators pain-related P1 amplitude tended to be reduced during specific meditation states – OMM and LKM – as compared to resting state and FAM meditation. No specific effects of meditation state were yielded for P1 latency.



Behavioural and electrophysiological markers of attentional control and emotional regulation in expert meditators.

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Background: The capacity to focus attention on the present moment and effectively monitor stimuli in the environment is known to have positive impacts on cognition, sensory awareness and wellbeing. Indeed, individuals from the Buddhist/mindfulness tradition are widely reported to be experts in this domain. The current study systematically explored different components of attentional control (including emotional regulation) using a combination of behavioural and electrophysiological measures (i.e. EEG, eye blinks, galvanic skin response, respiratory rate) with a view to explaining the positive outcomes of long-term mindfulness/meditation and importantly the brain network changes in expert users.

Methods: A group of novice and expert meditator completed a series of computerised laboratory tasks aimed at measuring 1) baseline brain function, 2) brain and behaviour during mindfulness training and importantly 3) behaviour and brain activity during attention and emotional regulations tasks.

Results: Behaviourally, expertise was linked to a cognitive profile dominated by superior performance on a range of attentional control measures, emotional regulation measures and indices related to greater sensory awareness. Due to the relative novelty of the project we will also outline preliminary brain/physiological data suggestive of generalised slowing of the EEG (alpha/delta) associated with the relaxation elements on meditation, EEG gamma increases in meditators reflecting great attentional control, higher state of awareness and synchrony amongst disparate brain regions. Supporting event-related potential data related to attentional control (P3a/P3b components will be the focus) will also be the focus of the presentation.

Conclusions: We will argue for the employment of joint behavioural and electrophysiological measures to disentangle the precise benefits and mechanism related to mindfulness training.



Advanced Meditators' Lived Experience of Enlightenment Moment: A Phenomenological Study of The Mechanisms of Suffering Transcendence

Qi Wang

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Background and objectives: Spiritual Enlightenment is a common topic in most religious traditions, especially in Buddhism. Buddha was considered as the first person who reached enlightenment in history. The whole teaching of the Buddha was about suffering liberation, which is Enlightenment. Viewed as an important topic in Eastern culture, there are other understandings of Enlightenment based on Western psychology. However, with such an significant topic in the field of religious study, psychology and philosophy, there lacks operationalized definitions of the concept of enlightenment and comprehensive empirical study of what enlightenment experience is and what advanced meditators' narratives of their lived experience are. The purpose of this study was to explore the construct of spiritual enlightenment and essentials of enlightenment experience among people who are advanced meditators that come from different cultural backgrounds.

Methods: This existential phenomenological study adopted the in-depth semi-structured interview method to explore details of the process of spiritual enlightenment experiences depicted by advanced meditators. 21 participants who were long-term meditators from different religious backgrounds and meditation traditions were recruited by using purposive sampling. The interviews were digitally recorded and transcribed verbatim into English and the data was analyzed using existential phenomenological and combined with thematic analysis method.

Results: Six major themes were summarized from the data analyzed, including 1) enlightenment happens in a process under certain conditions; 2) during enlightenment moment, participants can directly experience and reach to the realization of spiritual wisdoms, including seeing nonself, emptiness, letting go and nonattachment, and seeing the nature of impermanence, suchness and suffering; 3) enlightenment moments usually accompany with sensuality events and rich feelings, including warmth, love and freedom; 4) enlightenment moments can come with people's physical reactions, including shaking, numbness, and the melt of body boundaries; 5) People may experience rich emotional reactions during enlightenment moment, and 6) people can reach to a meta-consciousness state during enlightenment moment.

Discussions and Conclusions: The findings provide new knowledge and understanding of spiritual practitioners' enlightenment experience under different cultural contexts. This research can contribute to the study of religions and spiritual experiences and the study of nonself concept in transpersonal psychology.



Mindfulness practice, dispositional mindfulness and the processing of aversive stimuli

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Background/Objectives: The mechanisms underpinning the beneficial effects of mindfulness continue to be elusive. Adopting an information processing perspective, this experimental study examined whether meditation experience could account for variations in the processing of aversive stimuli via differences in thought accessibility and mnemonic neglect. A secondary objective was to assess whether variations in dispositional mindfulness could account for differences in processing among non-meditators.

Methods: Experienced meditators (N=24) and non-meditators (N=46) constituted two groups. Within the latter, participants were classified as either high (N=27) or low (N=19) in dispositional mindfulness. Using a sequential subliminal priming protocol coupled with a lexical decision task (LDT), participants had to indicate, as quickly as possible, if a sequence of letters presented on a screen constituted a word or not. Participants each completed one hundred and ninety-two test trials, half of which included real words and half non-words. Each set of letters was preceded by a subliminal prime which was either aversive (failure) or neutral (bicycle). Three categories of words were used – judgmental (e.g., stupid), compassionate (e.g., kindly) and neutral (e.g., eldest) and were controlled for length and familiarity. Two different stimulus onset asynchronies were used but revealed no differences in responses so were combined in subsequent analyses.

Results: Non-meditators were more affected by the aversive prime than meditators. Meditators were faster to name compassionate words than either judgmental or neutral words; non-meditators named compassionate and judgmental words at the same rate. Meditators also recalled more words than non-meditators in a surprise recall task. Dispositional mindfulness had no effect on thought accessibility. However, contrary to expectations more mindful participants recalled more compassionate words than neutral or judgmental words; low mindful participants recalled all three word categories equivalently.

Discussion/Conclusion: The results suggest that mindfulness practice can alter information processing, possibly reducing reactivity to aversive primes and increasing receptivity to compassionate themes. Individual differences in dispositional mindfulness yielded somewhat different results thus calling into question the conceptualisation and measurement of mindfulness.