



Meditative states of consciousness in the hierarchy of cognition

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Introduction

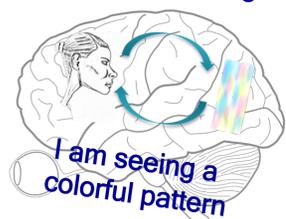
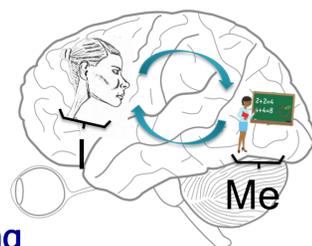
- Most meditation research focuses on clinical outcomes of mindfulness practices

Can meditation be used to investigate nature of consciousness?

- Traditional practices leading to altered or "absorptive" states of consciousness essential to this investigation
 - e.g., *Samadhi* in Yoga, *Jhanas* in Buddhism
 - Not studied much beyond their role in cultivating attention

Proposal: Absorptive states of meditation enable traversing through hierarchical stages of cognition

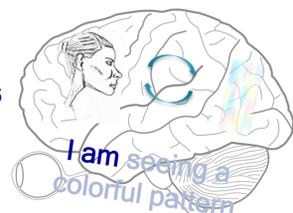
- Cognitive scientists distinguish two aspects of self^{1,2}
 - As object – "Me"
 - As subject and agent – "I"
- Based on object mode of functioning
 - Sensations/thoughts/memories/feelings as mental objects



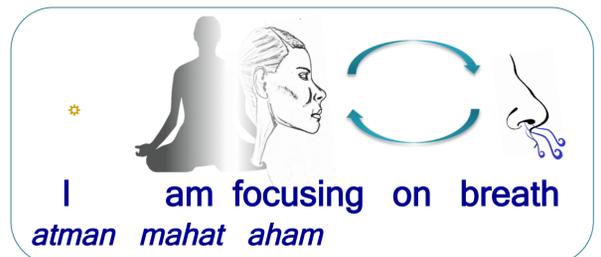
- Neural representation adapts^{3,4}
- Jump to a new object

Developing the Model

- During meditative mode of functioning
 - Persistent attention turns initial effortful concentration to relatively effortless focus^{5,6}
 - **Dampening of interaction between subject and object**
 - Revealing existential self (I am) behind the doer self
- Advanced practice: doer self absorbed into existential self – "I am"⁷
 - *Savikalpa Samadhi* in Yoga – meditation on form
 - Difference between self and others dissolved – subject-object dichotomy still exists – experience of transpersonal & blissful self
 - Thoughts present but not associated with
 - Comparable to form-based (*Rupa*) *Jhanas* of Buddhism
- More advanced practice: absorption of existential self into witnessing consciousness – "I"⁸
 - *Nirvikalpa Samadhi* - meditation on formlessness
 - Subject-object dichotomy dissolved into non-dual and meta-empirical transcendental self (*atman*) or no-self (in Buddhism) – highly blissful feeling upon return to normal consciousness
 - Cessation of all thoughts
 - Comparable to formless (*Arupa*) *Jhanas*



- During practice doer (*aham*) and existential (*mahat*) selves engaged in a competitive struggle



The Model

- Over a long-term period, one's meditation practice facilitates the transformation of an ego-based self (*aham*) to a transpersonal self (*mahat*)^{8,9}

This long-term goal of meditation can be formalized within the now ubiquitous prediction-based framework of cognition^{11,12}
- The brain predicts external world by constructing an internal model of it¹³
 - Based on stored beliefs about the world called "priors" – genetic or learned
 - Compares with incoming sensory information to generate updated beliefs or "posteriors"
 - Constrained by "hyperpriors" – e.g., only one object at a particular point in space at a particular instant in time



Old couple or musicians by Salvador Dali (1930)

- **Effect of meditation on cognition understood by a hyperprior on type of self identified as agent**
 1. If self is experienced as doer, outcome of action (posterior) automatically attached to ego-localized self
 - Subsequent predictions: higher affective arousal
 2. As existential self representation strengthen, self may be identified as ego-localized or transpersonal
 - More volition over attributing agency to either selves
 - Transpersonal self mitigates subsequent arousal
 - Transpersonal self hyperprior (TSH)

Explanatory Power and Future Directions

- Different meditation practices work towards a common goal – strengthening the TSH
 - Concentrative practices enable empirical dissociation of doer and existential selves
 - Mindfulness practices volitionally apply TSH to new and previous experiences
 - Morality and compassion based practices enable experiencing others as self
- Attention in predictive framework¹⁰
 - Most meditation studies invoke attentional enhancement
 - Understood as modifying weights of different priors that combine to form internal model or reduced uncertainty in their distribution
 - Meditation may act to more optimally tune weights or decrease uncertainty (noise) in distribution of priors
- Future work
 - Self prior(s) – one or many?
 - Role of mystical and altered self experiences in meditation and well-being
 - Better integration of more widely studied practices with lesser understood traditions/practices

Acknowledgements and References

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