

Supplement: Further examples of connections between yoga concepts and neuroscience content

Yoga concept	Related neuroscience content
<i>Samskara</i> (conditioning; habitual behavior or thought patterns)	Neural bases for learning: Neuroplasticity and long-term-potentiation/depression (Kalat, 2008). Discussion of how mental (just like physical) habits and practice can lead to synaptic and brain changes and thus to strengthening/weakening of mental patterns. For example, maladaptive thought patterns characteristic of depression can lead to relapse into depression while practicing adaptive patterns (through mindfulness or cognitive therapy) can break this cycle (Teasdale et al., 2000).
<i>Asana</i> (yoga postures, 3 rd limb of yoga)	Embodiment: psychological and physiological evidence of how posture and facial expressions influence cognition, emotion and physiology. (e.g., Carney et al., 2010, Hennenlotter et al., 2008). Somatic markers (as cited in Williams et al., 2007): physiological events associated with emotions that can influence cognition.
<i>Pranayama</i> (breath control, 4 th limb of yoga)	Effects of slow, regular breathing on parasympathetic/vagal activity and heart rate variability (HRV). Evidence that HRV is related to both mental and physical health (Lehrer and Gevirtz, 2014).
<i>Sukha</i> ("good space", happiness) vs. <i>Dukha</i> (suffering)	Neural mechanisms of emotions and stress: role of the limbic system, prefrontal cortex (PFC) and its asymmetry, autonomic nervous system, HPA (hypothalamus-pituitary-adrenal) axis, cortisol, GABA, etc. (Kalat, 2008). Research evidence from contemplative neuroscience that meditation and yoga can cause beneficial changes in neural functioning and structure, e.g. changes in prefrontal cortex activity and thickness, limbic system functioning and structure, and GABA release (e.g., Streeter et al., 2010; Davidson et al., 2003; Hoelzel et al., 2011). Effects of stress and meditation on telomere length, telomerase activity and presumably cellular longevity (Conklin et al., 2015).
<i>Pratyahara</i> (sense withdrawal, 5 th limb of yoga) <i>Dharana</i> (concentration, 6 th limb) <i>Dhyana</i> (meditation, contemplation, 7 th limb)	Characteristics of mindfulness practice and findings of its benefits in contemplative neuroscience (e.g. Davidson et al., 2003; Konnikava, 2012; Tang et al., 2015; also see above).
<i>Yamas</i> (ethical practices), especially: <i>ahimsa</i> (non-violence) <i>aparigraha</i> (non-grasping), <i>Niyamas</i> (spiritual practices), especially: <i>santosha</i> (contentment) <i>tapas</i> (disciplined, regular practice)	Relationship to the non-judgmental, self-compassionate, open awareness in mindfulness and benefits of its regular practice (see above, and Gard et al., 2012).
<i>Koshas</i> (sheaths or layers of the self, such as body, mind, breath, emotion)	Different foci of mindfulness practice (such as mindfulness of body, breath, thought, emotion). Relationship to somatic markers (see above). Relationship to the cognitive, emotional and physical aspects of depression and other mental disorders (William et al., 2007).