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Review Article

Spiritual Consciousness and the Integrative Brain in Health and Conflict

Janine Joyce1*, Grant Gillett[2], Heather Devere[3]

[1]Department of Health Science, Yoga, Meditation, University of Otago, NewZealand

[2]Department of Bioethics and Neurology, Dunedin School of Medicine, University of Otago, NewZealand

[3]Department of Conflict Studies, University of Otago, NewZealand

***Corresponding author:** Janine Joyce, University of Otago, NewZealand, Tel: +64 34794546; E-mail: janini.nz@gmail.com

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Abstract

Spiritual consciousness has been of interest to human beings for millennia. Recent scholarship has made it possible to examine the notion that spiritual consciousness potentially entrains an integrative brain, which in turn expresses itself in potential wellness and relational benefits. Furthermore it seems that such brain entrainment may lead to natural expressions of peace.

In a qualitative study 56 participants from two communities (Aotearoa NewZealand Maori community and Sahaj Marg global community of Raja Yoga practitioners) were asked to define and describe their experience of spiritual brother-sisterhood and the practices that encouraged it. Recent health science scholarship has the identified themes related to such a consciousness as: an awareness of an inner existential reality, a sense of deep relational connectedness, transcendence, and power/force/energy. These common themes suggest that there is a need to consider more deeply interpersonal neurobiology, its links to spiritual and cultural narratives, and research findings. It seems there are possible implications for developing 'spirituality as biology' in a way that links human beings to the natural world in a sustainable way.

A conceptual base of spirituality as relational, metaphysical and biological is developed on the basis of John Hugh lings Jackson's view of evolved nervous function as integrative and co-ordinated. Terms suggested by the theoretical account were then compared with the lived experience of participant's convergences between the neuro-cognitive theory and Yogic and Māori traditions.

Keywords: Spiritual Consciousness; Brain Integration; Brain Entrainment; Māori Spirituality; Sahaj Marg Raja Yoga; Natural Ethics; Aotearoa NewZealand; Conflict Prevention; Health Well-being.

Introduction

There is a need to consider more deeply interpersonal neurobiology Siegel [1,2], its links to spiritual and cultural narratives and research findings and the possible implications for developing 'spirituality as biology' in a way that links human beings to the natural world in a sustainable way. To further this understanding we will explore: i) meditation, ii) self- transformation, iii) the relational brain, iv) the group brain and social cognition, v) interpersonal neurobiology, vi) compassion and the moral brain, vii) neurology and peacekeeping, and viii) participant narratives of awakening and awareness.

Meditation: a traditional method for the development of spiritual consciousness

According to the literature, the practice of meditation af-

fects human beings in many ways. Research has focused upon the effects of meditation upon physiological and psychological well-being, higher order cognitive functioning, attention and focus and brain activity [3-7].

Psychological studies with clinical populations have shown that meditation gives positive benefit in the areas of anxiety, addiction, suicidal tendencies, chronic pain, aggression, depression, insomnia and hypertension [8-10]. The meta-analysis by Grossman and colleagues (2004) showed beneficial effects for meditation on measures of general health. Meanwhile neuroimaging studies suggest that meditation may enhance activation of the brain areas that are involved in emotional processing and empathy but the exact link between these functions and the health benefits are unclear and under-the orized. The Yogic view that regular meditation leads to inner balance and less reactivity in relation to environmental stressors may offer us an entrée into the elusive theory especially when combined with Maori understandings of human beings and their place in nature.

According to Raja Yoga, meditation is the seventh stage of practice [11-13]. For Sahaj Marg practitioners it is the main method of their practice although the order differs from the classical prescription of Patanjali [14]. Sahaj Marg, as a form of Raja Yoga, takes up meditation, followed by concentration, followed by samadhi (bliss), as the progression to realizing the self as a spiritual being [15].

Studies, specifically on Raja Yoga meditation approaches, show beneficial effects such as lowered serum cholesterol and low-density lipoprotein-cholesterol in post-menopausal women [16], beneficial heart rate, blood pressure and electromyography changes [17,18], and improvement of cardio-respiratory functions, and modulated mucus-borne immunity [18-20].

One study on the physiological effects of Raja Yoga meditation gave intriguing results as the measure of heart rate during the meditation period increased compared to the preceding baseline period and the value during control sessions. However, there were no significant group changes during meditation, in palmar galvanic skin response, finger plethysmogram amplitude, and respiratory rate [21]. These results indicating increased energy and metabolic activity but no change in characteristic indices of stress were quite compatible with the brain connectivity enhancement discussed below.

Recent brain and meditation studies show that different meditation practices implicate and affect different areas of the brain [22-24]. Jonathan Shear, in a recent article on meditation and pain, remarks: "Meditations differ in both their ingredients and their effects, just as medicines do. Lumping them all together as 'essentially the same' is simply a mistake" [25]. In the same article, his colleague Fred Travis concurs, "explicit differences between meditation techniques need to be respected when researching physiological patterns or clinical outcomes of meditation practices. If they are averaged together, then the resulting phenomenological, physiological, and clinical profiles cannot be meaningfully interpreted" (ibid., p 1).

Travis and Shear [25] classified meditation practices into three groups according to their neurological effect. The first group was 'focused attention' meditation approaches characterized by beta/gamma activity, for example, Tibetan Buddhist (loving kindness and compassion), Buddhist (Zen and Diamond Way), and Chinese (Qigong) traditions. The second group had meditation approaches that taught 'open monitoring', and were characterized by theta activity, and include meditations from Buddhist (Mindfulness and Za Zen), Chinese (Qigong), and Vedic (Sahaja Yoga) traditions. The third group comprised meditation approaches based on an 'automatic self-transcending', which were characterized by alpha1 activity, and included meditations from the Vedic and Raja Yoga traditions [25]. These findings are best interpreted with the help of a general heuristic frame work: The sort of information processing varies with the frequency of electro graphic activity, and the distance over which it is coherent. For purely perceptual processing, presumably involving just the primary sensory cortex, gamma activity predominates; information processing at a cognitive level evokes beta activity; and high level processing involving working memory or top-down influence on perceptual processes elicits alpha-frequency activity [26].

Theta activity is lower in frequency than those mentioned and is uncommonly found in the waking state. In fact, the frequencies involved respectively show a more localized task or topic related (small or middle range intracerebral distance and higher frequency) brain connectedness and coherence of brain function (35 Hz - gamma) a more cognitively inclusive range of activity (13-35Hz beta) or the most widely integrating (8-12Hz alpha rhythm) which seems most involved in yoking widely disparate areas together. One presumes that theta activity indicates a highly synchronized and unfocused mode of awareness undistracted by incidental cognitive or perceptual targeting.

This classification perhaps reflects a shift in the focus of research into meditation from: 'does meditation work?' To 'how does it work?' Consequently, there has been a call for the development of psychological and philosophical theory and specific measurements linked to meditation traditions. Sedlmeier, Eberth, Schwarz, Zimmerman, Haarig, Jaeger & Kunze, [27] undertook a meta-analysis discussing the different approaches to meditation and pointed out that there is a lack of precise theory or understanding in the empirical research. The EEG data is helpful here and allows analysis of the different kinds of cerebral processing

being encouraged in different techniques. They make the useful distinction between meditation practices, based upon the Eastern theoretical approaches with the goal of transformation, and those based upon Western theoretical approaches with the goal of self-regulation and what could be termed stress management [27]. They noted that none of the 163 studies included in their meta-analysis explicitly dealt with the real goal of meditation defined as the development of higher consciousness and enlightenment but the current discussion may help to give some clarity to that definition and its cerebral concomitants.

The methods of meditation listed suggest that in the East some practices actively integrate and harmonize areas of the brain traditionally regarded as instinctive or emotive with those regarded as perceptual, intellectual, or analytic. Travis & Pearson [28] asked 52 participants to describe in their own words their deepest experiences of transcendental meditation and identified three main themes: (i) the absence of space, time or body sense, (ii) peacefulness, and (iii) unboundedness.

It seems that the Sahaj Marg meditation practice, with its goal of 'complete oneness with god,' also aims beyond intellectual enlightenment and liberation and aspires to 'human integration' [15]. A great deal of energy is given to regular speeches and training courses so that aspirants practice sincerely and correctly to go beyond a focus on self and attainment. Although combining approaches from various meditations is discouraged, it seems that some practitioners are still likely to do so, and there is a practical argument that meditation may not exist in a pure form, as many meditators have tried the different methods and might still use earlier practices after switching to a new form of meditation [27].

The human mind, according to the Yogic scientist, is more than consciousness or neurology [29] but offers a means of bridging the world and the plane of symbolism or abstraction to the point of encompassing influences that go beyond and present involvement with a real life situation even though the means of detachment might be a focus on one's own physiological processes.

For Maori people there are deep cultural understandings and practices that concur with Yogic understanding of human consciousness. The importance of respectful, devotional and loving connections, attunement and spiritual awareness of mana atua (the essential forces that generate and animate particular realms of reality), mana tangata (the relational and divine aspect of human beings), and mana whenua (the live essence of the land) is culturally entrained [30]. Broadly the similarities between Māori and Yogic science include: i) all of life as interconnected and ongoing processes of moving energy, ii) the human body is comprised of matter and spirit, iii) methods exist that realise the Self, iv) well-being begins at the subtle level of existence, v) there are universal and ethical laws for human beings and vi) the essence of spiritual consciousness is beyond the sense organs and involves practices of attunement and remembrance [31].

Self-transformation

There is a great deal of evidence showing that meditation affects the function and structure of the brain. Luders, Clark, Narr & Toga [32] in their study on the effects of meditation using Diffusion Tensor Imaging to access neurological white matter density and brain connectivity concluded: Interestingly, existing findings appear to support the notion that significant links between meditation and brain anatomy are widespread throughout the entire brain involving both cortical and subcortical regions (eg., superior, middle and inferior frontal gyrus, orbito-frontal cortex, paracentral regions (including somatosensory cortex), inferior temporal, superior temporal, fusiform, and cingulate gyrus, insula, thalamus, putamen and hippocampus), as well as the brain stem and the cerebellum (p 1315).

The involvement of learning in establishing widespread connectedness through these meditative tasks was also noted in a study which used functional magnetic resonance imaging (fMRI) to indicate that positive emotions such as loving-kindness and compassion can be learned through meditation in a similar way to that in which playing a musical instrument or being proficient in a sport is learned through practice and focus [33]. The scans revealed that brain circuits used to detect emotions and feelings were dramatically changed in subjects who had extensive experience practicing compassion meditation. The scans revealed significant activity in the insula (a region underlying and serving as a basal ganglion for the frontal portion of the brain that plays a key role in bodily representations of self-emotion, pain, and empathy) when the long-term mediators were generating compassion and were exposed to emotional vocalizations. The strength of insula activation was also associated with the subjective intensity of the meditation as assessed by the participants. This kind of task also increased activity in the temporal-parietal junction (TPJ) and particularly that of the right hemisphere. This area is important in processing (non-verbal or intuitive) interpersonal perception and especially in perceiving the mental and emotional state of others and relating it to oneself. An ability to appreciate interpersonal connectedness at a level not mediated by language and common interests is therefore likely to be part of the explanation here being explored.

Hőlzel, Carmody, Vangel, Congleton, Yerramsetti, Gard, & Lazer [34] found an increase in cerebral grey matter after an eight week program of mindfulness meditation and concluded that meditation affected the neurological areas associated with learning and memory processes, emotional regulation, self-referential processing and perspective taking. Luders, Phillips, Clark, Kurth, Toga & Narr [35] also found that meditators had greater density of connective fibres in regions implicated with emotional regulation and

response control suggesting an enhanced connectivity and ability to rapidly relay electrical signals. Perhaps this is implicated in the self-modulation, responsivity, sensitivity, and relational connection to others that are described in attempts to define spirituality.

In the Vedic Upaniṣads, the untrained mind is likened to a fish which swims back and forth, from one bank to another, where the two banks of the river represent the conscious and the unconscious regions of the mind [36] one focused on topics of interest the other driven by desires. The Maitrayini Upanisad (VI: 25) specifically defined Yoga as: the unity of the three aspects of personality (senses, the mind and the life force/ prana) in which one ceases to be under the influence of cravings and thoughts. In EEG terms we might expect to find this change manifest by a shift toward theta and alpha frequencies of intracerebral resonance (implicating relatively wide integration and unfocused information processing activity).

According to Sahaj Marg the experience of mind during meditation can be: i) imagination, ii) cleaning of impressions, and iii) 'revelatory' experience. A number of Māori and Sahaj Marg participants shared revelatory experience. There is some evidence suggesting that spiritual experience may be related to variability in serotonin 5-HT1A receptor density in the dorsal raphe nuclei, the hippo campal formation, and the neo cortex [37]. In their study the spiritual acceptance scale was correlated significantly with serotonin: "The spiritual acceptance scale measures a person's apprehension of phenomena that cannot be explained by objective demonstration" (p. 1967). However, the other aspects of the self- transcendence dimension, religious behavior and attitudes, were correlated with low binding potential. The correlation between 5-HT1A receptor density and self-transcendence was fully dependent upon the spiritual acceptance scale. It seems that spiritual attitudes and religious behavior do not require high levels of serotonin 5-HT1A receptor density, however spiritual acceptance and perception does [37].

They found that scores for spiritual acceptance versus material rationalism correlated significantly with 5-H1A binding potential. Significance was also demonstrated for self– transcendence and 5-H1A binding potential (2003, p. 1967). The spiritual acceptance scale measures a person's apprehension of phenomena that cannot be explained by objective demonstration. Subjects with high scores tend to endorse extrasensory perception and ideation, whether named deities or a commonly unifying force. Low scorers, by contrast, tend to favour a reductionist and empirical world view [37].

Participants in this study accepted and had direct experience of spiritual phenomena. For both groups such experiences were valued and recognised as natural: The third category is what master has referred to as 'revelatory' experience. Very valuable nature as they contain messages from the inner self of the Abhyasi which, if properly interpreted, can help him considerably in his journey. Such experiences may come during meditation sittings, or as dreams. Master has also stated that orders, instructions, and advice from the master himself can be conveyed in this way" [38].

The Relational Brain

The brain comprises of the cerebral cortex, in turn comprised of the left and right hemispheres, connected by bands of tissue known as the corpus callosum [39,40], and subcortical structures. Diverse cortical areas subserve diverse information processing functions often resonating with other areas through linked subcortical centres and they are led by the frontal lobes (which gather information from the widest range of other cerebral locations, both cortical and subcortical) in responding in detailed ways to the environment [41]. The corpus callosum integrates the information between the two hemispheres and allows the transfer of information to coordinate bodily activity so that whereas our brain was once described as just one organ then researchers are beginning to write about the two brains held within the two separate hemispheres of the cerebral cortex (Schore, 2012) we are now realizing that contemporary human cognition integrates the whole package [42].

According to Carter, Aldridge, Page and Parker [40] the right hemisphere has its main growth in the first two years of life and is responsible for non-verbal communication including tone of voice, gesture, facial expressions of affect and perception in receiving signals from the outside. This hemisphere is dominant for a global view of the inner and outer worlds. It provides direct connection with the autonomic nervous system and holds the awareness of physiological states coming from the body. In this context it is interesting that mindfulness practices develop as an outcome the capacity for the human being to be more aware and present to the inner and outer experiences.

The brains of women, on average, are said to have a greater density of corpus callosum fibres and given this anatomical difference, one might expect female meditators to demonstrate more intuitive sensing of implicit holistic meaning, but it may merely indicate in women a greater propensity to integrate verbal and non-verbal approaches to life's daily tasks. In in meditators, other modes of integration may render this natural propensity for integration somewhat less critical such that male participants were equally adept at sensing by heart because of neurological changes induced by meditation itself and a higher level (of symbolic and inclusive) mindful and spiritual connection with the Master and tūpuna.

According to the literature the left hemisphere is responsible for linear and logical processes and is concerned with 'conscious explicit' cognition whilst the right hemisphere receives emotional information through non-verbal channels and is concerned with

unconscious aspects of experience. Mc Gilchrist [43] discusses the divided brain and the making of the Western world, postulating that the differences between the brain hemispheres are so profound that it is as if each hemisphere has its own distinctive mind. Each 'mind' creates a coherent, different and often incompatible version of the world driven by competing priorities and values (p 35).

The representation of the two hemispheres is not equal, and that while both contribute to our knowledge of the world … one hemisphere, the right hemisphere, has precedence in that it understands the knowledge that the other comes to have, and is alone able to synthesis what both know into a useable whole (p 40).

He notes that the left 'mind' argues-drives the organism along a path designed to realize a formed conception of the world and to hold to that program regardless of distractions whereas the right 'mind' is naturally more holistic and intuitive in a way reminiscent of the 'natural' (or stereotypical) function of the brains of women which actually have a greater density of corpus callosum fibers.

Recent research has shown that the human adult brain responds by demonstrating structural and functional plasticity, the term used for the brain's capacity to continually adjust to new information in response to experience [44-46], a change that can take from a few minutes to days (May, 2011):…it has the capacity for continuously changing its structure, and ultimately its function, throughout the lifetime. This capacity to change, which is known as brain plasticity, allows the brain to respond to environmental changes or changes within the organism itself [47].

It is therefore not surprising that studies show that the practice of meditation affects the function and structure of the brain [22-24] as can the 'word' as shown in the functional and structural brain changes that occur during verbal psychotherapy and other learning tasks [48-50]. The grey and white matter brain changes induced by compassion based meditation practices enhance our emotional and somatosensory brain representations of other's emotions (empathetic relating) an effect enhanced by meditation 'expertise' [35,51,52]. The study used Functional Magnetic Resonance imaging to show that compassion meditation activates the areas of the neuronal network involved in empathic processing of the same state as if one-self were in pain when one sees someone else in pain. A similar effect is also described in the research on the function of neurological mirror cells: A 'mirror neuron' is a brain neuron that is activated ('fires') when a living being (such as humans and other animals such as primates and mammals) observes the action of another. In other words, if an individual watches another person eat an apple, the exact same brain neurons will fire in the person observing the action as if they themselves are performing the act [53].

The ability to enter deeply into these non-intellectual states of self-evoked in various ways (e.g. by actions and feelings of others has an important connection with spiritual practices. Recall that the practice of Raja Yoga is interested in the union of the self and begins with physiological processes of breathing5 and postures6 [54,55]. These aim at "strengthening" or purifying the system7 and relaxing the mind-body in order to achieve a deep internal integration. Yoga teachers express concern about the problem of the modern mind. By this they mean a mind associated with a brain that is not integrated due to stress, anxiety and, for many, trauma. Bertrand Russell's The Conquest of Happiness, (1932) describes aspects of a Modern Mind which would be familiar to these thinkers. He describes the ennui of the modern mind where basic survival needs have been met and yet the individual still chooses to focus mental resources in a reduced self-interested way.

I believe this unhappiness to be very largely due to mistaken views of the world, mistaken ethics, mistaken habits of life, leading to destruction of that natural zest and appetite for possible things upon which all happiness, whether of man or animal, ultimately depends. These are matters which lie within the power of the individual… (p 18)

If we understand zest as 'a great enthusiasm or energy' then it reminds us of the indications of increased energy related to the Yogic understanding of prana and will (but unrelated to stress indices) and manifest in changes induced by meditation. Yogi describe such a mind as self- absorbed and self-interested, creating automatic cycles of thought, worry and anxiety about one's own circumstances, personality, and life situation. It is therefore intriguing that neuropsychologists are beginning to suggest that stressful life experience and trauma may impact on the growth of the fibres in the corpus callosum. This may interfere with the integration of knowledge between the two hemispheres and limit the development of a coherent sense of self and life events [56]. Other studies also note the sensitivity of the brain to external stress: … stress induced reactions in 5-HT1A receptor binding and alterations in serotonin activity may contribute to the etiology of both anxiety and depression. It may be that under situations of extreme or chronic stress, individuals who are at risk for depression and anxiety experience greater reductions in 5-HT1A binding and greater alterations in serotonin activity than do individuals who are comparatively stress resilient [57].

Some authors suggest that spirituality may contribute hormonally to stress resilience: "chronic stress may lead to down regulation of 5-HT1A receptors, spirituality and religiosity may enhance the functioning of the serotonin system, fostering resilience and protecting against the development of posttraumatic mental illness" [58].

Whilst these functions and the right brain develop most in the first two years of life, plasticity means that our brain remains

receptive and open to change throughout the lifespan as is evident from studies showing that we can change in response to verbal psychotherapy [48], and meditation practice [32]. We can, it seems, not only learn compassion and empathy but also develop the neuronal pathways facilitating these responses.

Non-verbal processes are useful in assisting the right brain to reintegrate and perhaps this is potentially the greatest assistance of all the Yogic techniques in conflict transformation. These activities assist the human being on all levels to become a peaceful presence by encouraging inner coherence.

In this study the relational practices of the two communities encouraged such things as positive emotion, optimism and humour, cognitive flexibility, cognitive reappraisal in response to altercations with others, a moral compass grounded in spiritual maxims and tikanga (tikanga Māori is the process of living by Māori Values which are embedded and enlivened by practices of spirituality) and social support. Several of which are identified in the literature as building neurological resilience to stress: i) positive emotions, optimism and humour, ii) active coping style, iii) facing fears, iv) cognitive flexibility, explanatory style, cognitive reappraisal and acceptance, v) moral compass, vi) physical exercise, and vii) social support [58]

Travis & Pearson [28] found increased frontal lobe coherence, alpha and gamma power ratio in relation to other frequencies, and more efficiency in cognitive tasks (usually associated with beta activity) for participants who frequently integrated transcendence with day to day tasks. They also found high correlation between these modes of neurological integration and moral reasoning.

The Group Brain

The narratives of participants report many experiences of an invisible unity of communication and knowing (the Sahaj Marg group called this heart-to-heart): What does a "consciousness of connection" mean to you? The Spiders web. We are all connected and our lives are intertwined. Everything we do has an effect on everyone and everything else. Once we become conscious of this connectedness, we begin to adjust our lives accordingly. Our thoughts, words, deeds, it has been laid down in the Ten Maxims. We begin to live more simply, very naturally. We know that this is how nature intended it to be and that a simple life is better for us and everyone else. We realize the importance of our Sadhana because our spiritual progress is our duty to ourselves and everyone else. Attachment to people and worldly things leave us, because we know we are all connected to each other, and all connected to the source. And this becomes the only thing that matters. Knowing that all strings lead back to that same source and knowing that life is a process of continuous change and transformation helps us to develop faith. We are never alone and we are always supported if only we are looking the right way. The answer to any question is always at our fingertips. All that's left to do is for us stay aware of this universal connection. It's the framework of our experience and it gives us support and stability even in times of great upheaval.

The spider analogy is common both in Māori and Yogic thought; "The similes employed by the Upaniṣads, salt and water, fire and sparks spider and thread, flute and sound assume the existence of an element different from being". For Māori participants an invisible unity of communication and knowing was connection through wairua (or spirit): "You become part of the whānau/ family because there's this automatic connection and actually everybody is attuned to their intuition". This sense of unity was not a momentary experience but rather an ongoing mode of embodiment a connection to Master, tūpuna, Atua mediated by: i) a process of willpower, ii) cognitive remembrance, iii) daily practices of attuning attitudes and behaviors, and iv) a feeling of awe, reverence and zest an experience that was multi-dimensional in its practice and expression. Davis [59], approaching spirituality through cognitive neuroscience, moves us towards a greater perception of the subatomic world that we are part of: "…the brain is capable of providing an experience of unity and bliss and that this may be triggered by electromagnetic fields" [59]. He goes on to suggest that Spiritual Values such as Truth, Love, Unity are certain frequencies that human beings respond to and are enlivened by: Universal Values are an invisible yet apprehensible presence, essences and forces, which may beget noble human thoughts and feelings that are beneficial to the body, our mental, emotional and physical wellbeing. To explore and embody Universal Values leads to the Exploration of the Source of All Values. The Value Giver, the Ultimate Value and Everlasting Never Changing Presence (p 67).

In practice, it seemed that this shift in focus or awareness happened for many Sahaj Marg participants in relation to the inner Master as a transcendent, omniscient, omnipresent, source and presence while Māori participants had a deep and similar connection to Atua and tupuna. From these perspectives I have viewed the experience of study participants as resting on a mode of brain function attuned to a field of connective frequencies and intelligent shared consciousness.

Davis [59] describes an individual brain, attuned to Spiritual Values, as offering a "cosmic brain map" embodying a neurogenetics of peace: Such a cosmic brain map is grounded in thought patterns and brain activity capable of eradicating discomforts in the body by the agency of the mind and spiritual values and it is a brain compatible to thoughts without limitations where everything and anything is possible. For this kind of brain peace is accessible at all times, in any situation. This has been described as a peace that surpasses all human understanding, a brain that is at peace,

even in the face of life-threatening events, a brain that is most of the time entrained and in synchrony with the heart, respiratory, digestive and nervous systems".

Davis [59] regards a transient spiritual experience as quite different from a cognitive attunement:

"Reporting a Spiritual Experience of "Oneness" with the Universe that one has at a given point in time is different than "manifesting the love of God continuously" in actions and words like, "I Am The Love and The Light of God" implying an Identity and an ongoing way of being rather than just a transient experience" (2006, p 60).

There are few studies of the neuro psychobiology of spirituality or what Davis calls "a cosmic brain map" but participants in the present study appear to give glimpses or indications of what Davis [59] describes as an: "Emergence of a fully conscious Human Being who physically embodies and expresses continuously Universal Values" (p 67) suggesting a new area of cognitive neuroscience scholarship, once purely the preserve of the mystics.

Interpersonal Neurobiology

Interpersonal neurobiology refers to an integrated understanding of the effect of interpersonal experience on the brain: The entity we call mind can be understood in the simplest terms as patterns in the flow of energy and information … Thus, though we may speak of mind as emanating from the neurobiological processes of the brain, this … is an abbreviated way of referring to the flow of energy and information within the brain as a fundamental part of the functioning of the body as a whole. The patterns in the flow of energy and information, the essence of the mind, are a product of both bodily (neuro physiological) processes and interpersonal interactions [2].

In many ways this seems similar to the Yogic definitions of mind as citta – a way of referring to the human connections that create the neural connections from which mind emerges so that what are treated as spiritual processes may directly shape neurological integration.

The necessary processes of individual change prior to any emergence of a cosmic brain map and the level of connectedness and attunement that these participants experienced see m, from observing practitioners, but require certain practices. These may be cultural practices that nurture connected-ness during childhood or spiritual practices that allow changes in adulthood. Both routes promote differences in the neurobiology of those who relate in such ways.

Neurobiology of spirituality is not well understood ... There is some evidence from positron emission tomography studies to indicate that spiritual or self - transcendent experiences are associated with density of 5 – HT1A receptors, implicated in the psychopathology of depression, in the dorsal raphe nuclei, hippocampus, and neo cortex of healthy adult males [58].

Participants, who develop an integrated mind via the Yogic processes of meditation and attitudinal change, described the process as difficult, emotional and, at times, uncomfortable. One practitioner talked of the difficulties of integration of the self and developing a consciousness of connection: I don't know why it's such an ongoing process. Why is it so difficult? Sometimes I think maybe it's a complex evolution from an animal brain through the human into? You know -- I have this idea that it's possibly about a growth of perspective -- simple as that. At first you see only yourself and if all you can see on one level is the separation between yourself and everything that you pick up or touch or bump into, talk to. And probably most animals live in that realm, although I can't say that I know that for sure… and then, a little bit wider, I think possibly where most people are, …we see these systemic processes, we harness them technologically very well, social structures and everything. But that's the systemic cooperative view and I think people are finding that we can no longer sustain in a competitive, individualistic which -- is all those things that we look down on in terms of moral values or see as being dangerous, morally. You know, greed, selfishness and so on. And we're seeing that those systems just can't sustain us socially anymore and also that there's a conscious move – we're looking at people starving around us and going -- 'hold on this isn't working'. And I think that's the systemic level ... From the individual, to the tree, through to the systemic entity of the forest for example. Those systems overlap, emerge and become unified. Then it becomes unified – with universal prana. And I wonder, possibly, if it's a matter of evolution of awareness.

This is the kind of integration in neuro-cognitive processes that Hughlings Jackson regards as the basis of "universal and most complex representation … and co-ordination" (1887, p. 34). Others describe an evolution of awareness happening in an ordinary way, as the condition of the heart and mind change rapidly if there is remembrance or attunement via 'thought – feeling' to the energy of the Master - a mind that was already stable and tuned.9 However, some Sahaj Marg participants experience self-doubt and confusion and Badenoch and Cox (2010) argue that group therapy can be aided when participants realise that issues may be neurobiological in origin rather than character flaws, thereby increasing self-compassion, and decreasing blame and shame (p. 465).

The practice of observing one's own mind, as well as the minds of the individuals in the group builds in a layer of processing via increased integration between the middle prefrontal cortex and limbic regions, creating a broader perspective and a sense of confidence and stability, often followed by increased compassion" (p. 464).

They suggest that as the limbic system settles into a less stress-oriented pattern as a result of this internal integration, the reduction in reactivity allows a greater range of experience to emerge in the group. Whilst Sahaj Marg and Māori participants were not in therapy, they all experienced natural, intimate and prolonged group living so that understanding group process is helpful in explaining the recorded observations and experiences and the neurobiological evidence indicating that human beings experience physiological resonance, one to another. Buchanan, Baley, Stansfield & Preston [60] examined the contagious effects of physiological stress. They studied public speaking as a stress producing activity and measured salivary cortisol (measure of activation of the hypothalamic pituitary Adriano cortical and sympatho-adrenomedullary stress axis in human beings) in speakers and observers to discover a resonance in salivary cortisol between the two groups. They concluded: "In human behaviour, emotional contagion is described as a simple state in which one simply catches the emotions of another, producing a similar internal state in the observer that resulted directly from the observation" [60].

This finding suggests one possible mechanism of the spiritual benefit of spending time with an actual master or in remembrance of the inner Master (for Sahaj Marg) or tūpuna and/or atua for Māori: It's just like this open space. You have a lot… massive… majestic. When you're in this world you are kind of boxed in kind of thing. … thinking about things all the time, you know. I've got to do this and if I don't do this, then this will happen…you know? But when you're connected with your tūpuna, with your spirituality, its space. It's massive and you are not. So you have more freedom.

This is a graphic introspective description of the escape from a confining, stressful or threatening experience in which one feels under demands and unable to be and enjoy oneself.

Compassion and Volunteers

Spirituality seems to be importantly relational [61,62] for the two communities being studied. The ashrams and organizational structure of Shri Ram Chandra Mission are run by volunteers from all around the world and many aspects of Māori cultural organisation, including maraes (meeting houses) and particularly the process of achieving justice (e.g. in terms of the Waitangi Treaty and land settlements), tends to occur through coordinated efforts. Māori leaders, with full, extended family lives and employment in jobs that were often low paying, alongside their tribal leadership roles act voluntarily in consensus building and in leading peaceful resistance.

Indeed, the first documented global example of passive resistance towards the British colonial soldiers was demonstrated by the people of Parihaka during the years 1879 to 1880. The village itself had been established in 1866 as a refuge for Māori forced off their land by the British crown, perpetrating the brutal land confiscation of 1865. Te Whiti-o-Rongamai and Tohu Kakahi led their people in a long dispute on land ownership and, in response to the soldiers forcing and destroying their village, showed no aggression [63].

Soldiers were met by women and children and given food and welcome. At no point was violence met with violence. It is difficult to imagine the depth of connection, solidarity and commitment that such a course requires from a people. According to Māori, the well-known activist, Mahatma Ghandi, learned about the actions and philosophy of Te Whiti-o-Rongomai from an Irish delegation that first visited Parihaka and then later met with Ghandi [63].

The actions of the Parihaka protest were extensively reported in English newspapers at the time [63] so that: In this storyline, the history of passive resistance begins with indigenous actors in Aotearoa, spreads to Ireland and then on to India before making its way across to the United States. It is an inventive whakapapa (genealogy) of non-violent protest in which the seeds of the family tree of passive resistance were planted by Tohu and Te Whiti at Parihaka (p 1089)

According to the literature there is a certain cluster of personality traits characterizing the person who is likely to volunteer, help or be pro-social: "empathy, a sense of responsibility, concern for the welfare of others, and a sense of self-efficacy" [64]. Costa, McCrae, & Dye [65] also describe pro-social personality traits: i) openness (active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety and intellectual curiosity); ii) agreeableness (trust, straight forwardness, altruism, compliance, modesty and tender mindedness); and iii) conscientiousness (order, dutifulness, achievement striving, self-discipline and deliberation).

How do such traits develop? Recent laboratory studies show that empathetic concern triggers the brain's release of the hormone oxytocin promoting collective action and pro-sociality [66]. The neural underpinnings are extensive: The neurobiology of social support is complex and involves many brain regions, biological pathways, and neurochemicals. The neuropeptide oxytocin is important in mediating social attachment and bonding, and has been shown to augment the anxiolytic affects of social support during stressful situations, perhaps by reducing HPA axis activity [58].

Oxytocin is the main neuropeptide associated with childbirth, breastfeeding, and the regulation of social behavior, affiliation, reproduction, communication, aggression and attachment in human beings [67,68]. Volunteers undertaking these pro-social activities may have a range of motivations (obligation, reputation) arising from a reduction in self-regarding concerns and an increase

in other regarding motives (Batson, 2010). Empathetic concern is a key factor in motivating collective action: "altruism, which can be thought of as putting one's moral compass into action, is a powerful contributor to resilience" in response to stressors" [58]. Sahaj Marg literature also offers that volunteering, an aspect of altruism accelerates spiritual progress or integration, especially if nourished by an internal remembrance of the Master.

Sprecher and Fehr [69] conceptualize compassion as a type of love that can be demonstrated both to close others and also for all of humanity. The define compassionate love as a behavioral, emotional, and cognitive attitude focused on care and concern for others manifest in supporting and helping in times of suffering and need. This type of love is described as selfless and self-sacrificing. Others identify three aspects of compassion: i) noticing another person's suffering, ii) empathically feeling that person's pain, and iii) acting in a manner intended to ease their suffering [70]. Notably, empathic sensitivity may not be translated into action and, in fact, feeling another's pain may be immobilizing [71]. Thus active compassion, more than empathy alone, requires action regardless of outcome as evident in the Māori participants' focus on compassion as encompassing empathy, altruism and action.

The act of volunteering in a compassionate way seems to produce positive outcomes, such as improved social bonds, enhanced well-being, feeling less lonely, depressed, and anxious, both for those acting compassionately and the others involved [72] and Sprecher and Fehr [69] conceptualize compassionate love as positively associated with empathy, helpfulness, volunteerism, and social support. Empathy in this context is defined as the: "capacity to understand and share another person's emotional experience" [33]. Empathy has been usefully summarized in a social work context as: i) the innate and the proximate mechanism for altruistic behavior, ii) mediated by neural networks, iii) including affect sharing, self/other awareness, emotional regulation, and perspective taking, iv) empathetic skills enhance resilience, and v) empathetic perspective taking leads to targeted helping of others [73]. Related literature on meditation shows positive influences on the quality of relationships [74,75]. Pruitt and McCollum's [76] qualitative study examined the effects of three meditative traits on close relationships and found: reduced reactivity, a greater sense of freedom and safety, and new understandings about the connections between people that enhanced understanding of concepts like unity, separation, intimacy and independence. Others have found that attitudes of mindfulness correlated with greater marital attachment and relationship satisfaction [74,75] so it seems that meditation leads to a humanizing of practitioners expressed in qualities and behaviors such as helpfulness, empathy, compassion, social support, connectivity, relatedness and reduced reactivity [77], all pro-social personality traits.

Compassion has been described as the outward concern for the well-being of others [78]; as a non-judgmental, compassionate attitude towards oneself; as an affective experience aimed at facilitating cooperation and protection for those who are vulnerable [79] and as part of a family of states including empathy, sympathy and pity. Buddhist literature adds other qualities including: loving-kindness, joy, sympathy, and equanimity [80]. Self-compassion adds another aspect: Being touched by and open to one's own suffering, not avoiding or disconnecting from it, generating the desire to alleviate one's suffering and to heal oneself with kindness. Self-compassion also involves offering nonjudgmental understanding to one's pain, inadequacies and failures, so that one's experience is seen as part of the larger human experience [81].

Psychotherapist Claudio Rud [82] adds that empathy is also self-transformative: …to empathize is then to be in contact: with myself, with the other, with the environment, all as one and one as all. It is a form of encounter that, as with any genuine encounter, is eternal — not because it lasts a long time, but because it fills 'all the time' (p 166).

It seems that in addition to being 'biologically wired' to respond and connect with the 'Other,' the capacity to 'feel deeply bonded' or attached to living beings in a universal way, is developed by study participants through various spiritual techniques cultivating cultural and psychological processes that promote a deep "remembrance" of human relatedness [38]. "Empathy is then, for me, a form of the practice of Otherness. Perhaps this is the primitive language in which we can all understand one another, the language of resonance that we share in our empathic communication" [82].

The literature on spirituality therefore embodies a universal ontology that encompasses transcendence of individual ego or 'i-ness' and leads towards a deep consciousness of connection and relationship [83,84] that integrates brain function by drawing on the most universal and diverse sources of information about one's own place in the world of nature and other sentient beings. For the Māori community, values of whakapapa encourage an understanding of one's profound connectedness in a balance with all other things encouraging practices celebrating interrelatedness and prosociality. The Māori word, whaaungatanga, which translates into English as 'connections and relationships' and a sense of communion and we-ness [85] anchors many protocols focused on around the communal meeting houses/marae that recognise and grow this sense of connection between people. Māori culture speaks of the quality of relationships that should exist between people and calls for respectful relationships with awareness of the responsibilities and obligations that arise from that. Volunteering combined with an internal attitude of remembrance or universal love, expressed in hospitality, are the life blood of practical spirituality.

Neurology and Peace Keeping

It is clear that the contemplative practices have a powerful effect on the neurology and personality of devoted practitioners and exploit the fact the brain maintains plasticity throughout the lifetime. Yoga is founded upon knowledge of practices and processes of physiological relaxation, alongside contemplative and attitudinal practices that are conducive to integrating the mind. The brain's plasticity and its responsiveness, explain why meditation and contemplation effect changes in brain structure and function related to compassion, intuition and empathy fundamental for personal well-being, conflict resolution, and peace building. These effects should encourage the use of contemplative and arts traditions in the transformation of post-conflict societies and the individuals who have to find sustainable ways of living in them.

Judith Schore argues from her work on the neural effects of trauma and therapy that a therapist has to find a way to be "psychobiological attuned to the patient's internal state" [86]. In contemporary society, riven with conflict, political alignments, and stresses of many different types we often encounter traumatized individuals who need to rediscover techniques of neural integration and the promotion of presence, calm, and states of peaceful awareness of self and others. The capacity of an individual to be aware of multi universes and to become attuned to the reality of others appears to be an outcome of individual spiritual development, and can plausibly lead towards social transformation [87]. If we recall the studies that examined the broad field effects of consciousness associated with collective practice of Meditation, we note that quality of life measures from archival statistics and content analysis of current events demonstrate a range of improvements including reductions in indicators like: i) unemployment and inflation, ii) violent crime, total crime, fires, mortality rate (except traffic fatalities), iii) traffic fatality rate, auto accident rate, iv) pollution, v) beer consumption rate and, vi) cigarette consumption rate [88-90]. Assessments of consciousness-based interventions on war and peace utilized; the Conflict and Peace Data Bank (COPDAB), war-related fatalities and injuries, and blind ratings of news content for evidence of hostile acts, verbal hostilities, and cooperative events [89]. Such measures suggested the positive impacts are not only individual and organizational, but also societal transformations [91]:

… qualitative and quantitative measures, or third-person perspectives can be used to investigate pure spirituality, applied spirituality, and spiritual development … enlivening the inner Being through experiences of pure spirituality … in turn leads to healthy changes in behavior, each individual personally becomes an instrument for transformational change in organizations… an "inside → out" approach to change' [92].

Awakening and Awareness

In this study of spiritual brother-sisterhood, participants from around the world were asked about their experiences of this concept in terms of the holistic views outlined in Yogic and Māori texts. All participants knew themselves as an individual consciousness with an awareness or realization of self as more than body mentioning spirit/wairua and unseen energies as influencing their biology. They gave many examples of physical change in their bodies in ways that suggested that some biological process may begin to be consciously viewed as a quantum expression of mind.

The following example highlights the participants' views about sacred spiritual and energetic being, including yama, niyama, and remembrance of connection: How we fit into the ecology, into the cosmology, into mythology and it comes back to knowing who you are. If you know who you are and you have a whakapapa that's Māori or if you have a whakapapa that's from Glastonbury and the ancients of the Avalon's. You know if you have the ancients of the Scottish there is the wisdom of the Celts. There is also the wisdom here in this when/ this land for everyone. But those adolescents-were the beginning of mankind's relationship with this land but are not the end point. They are a really good starting point to understand wairuatanga, manaakitanga but without that intrinsic sacredness, spirit- who are you as an individual- you can't go beyond.

The following expressed what this feels like as a way of being in the world with a series of constitutive connections to others according to whakapapa: What does it feel like- it feels peaceful, you know I want to stamp my hand on the table and scream it's about capacity, it's about change, it's about growth, it's about seeing what our true potential is. We don't know what our potential is. If we truly opened our hearts - do we know? Have we truly ever experienced a collective consciousness on this planet that is truly connected and truly about heart? I mean … it is beyond even my comprehension to think what that could look like. But it would feel incredibly scary and I think that's where the resistance … comes from; I feel we want to control, we want to be able to predict, and we want to know what's going to happen next. And so we miss things. When you open up your heart and allow things to flow and not be inhibited by the mind and our pre-socialised understanding about what this world is all about -- it's dizzying. Because when you do open your heart to experiences without that static, without that buffer -- life is different. Life is absolutely different and how we engage with it.

This excerpt conveys the sense of potentiality, of a shift in consciousness and what it might be like for a group of human beings to experience an invisible collective consciousness beyond

the pre-conceived differences based upon physical or cultural form, self-created fears and doubts consisting of prejudicial barriers based upon ignorance of our true oneness as human beings.

Many participants in this study described awareness as of a child, a consciousness open to a wider reception of knowledge and the negative influences that society, and its institutions can impose, provoking self-doubt and closing down of these capacities: When I was a young kid I used to see halos. I was bought up in the Mormon Church for a few years. I would watch the elders and go and look at these gorgeous halos and because they were elders I would think that it was okay. You know they are halos- it's all good! They were meant to have them because they were church elders. God has them so these people have them too. And then I'd see little colours and occasionally I'd get little feelings and I'd see things and things would come out of my mouth and then I was taught that was evil and wrong so in my teenage years I really struggled with seeing and feeling things because it was wrong.

For another participant her experiences of connection involved expanded levels of seeing and hearing and sensing for instance of they, her tūpuna/ ancestors: It started when I was about four. They used to yack away to me and it used to really upset my mother. Apparently it was because of me that we couldn't go to my granddad's funeral/ tangi because I said "no its okay mum he's just sitting over there and he's telling me that old lady's mean. That old lady over there is mean (which was my grandmother). So it was the only funeral that they never took us to and my older sister says 'if only you'd shut your mouth, can't you just shut your mouth' and I'm like 'okay'. I'd find things that had been lost. Like some people thought they had been lost forever and I would find them in rivers and other places.

Māori participants described a spiritual family of human beings as an intuitive recognition or tuning in, from which arises knowledge of how to support each other perhaps without words: And so you know when something's up and you know 'do I need to do anything about it' or does someone else. People within this room do that without having being told to do it- they pick up, we all pick up on. The right person then approaches the person rather than being left. Does that make sense? Others described this more esoterically in terms of human beings emitting an energy that connects each of us as a practical illustration of 'all of life as energy'(in Sankhya philosophy). It also suggests that time and spaces are constructs representing situations at certain levels of abstraction: "One thought following another gives us a conception of intervals which we call time, while that which separates them, is what we call space" [93]. In Sanskrit time and space are known as kala and desha and are self-created maya/illusion.

A Māori participant expressed a similar thought: For me it's about a connectedness and I suppose it's the image that I have is this light ball which is emanating from each of us as individuals and it's that connection that happens in the 'and space' my teacher calls it. Reweaving the web. It's those little nodules. I see me as a nodule on that woven world and when we have that wholeness then we are able to reconnect to others. Others and ourselves in the past, present, future, and in the now. I suppose brotherhood also elicits healing. Healing connectedness.

This is in "the woven universe"-whereby we are all connected and woven together as individual nodes whose being is relational [94]. In Sankhya philosophy cosmic energy is omnipresent and Yoga teaches one how to join with this energy - to find the cosmic frequency and tune in. A weaving together of subtle energy and attitudes of willingness and hospitality creates a process whereby we become like receiving stations of light - gifted, healthy bodies able to receive information from all sources: It's like when you go onto a marae and you do the hongi. And there's somebody (you've not met before) and you actually stop. You both stop. I always say kia ora (hello) and hongi but then all of a sudden you just have a feeling and it's there and you are pressed together and it might only be half a second but it feels like an eternity. It's like you know that person, there's something- you know the energy. You recognize the energy, and that person recognises your energy. That's happened - well actually that happens quite a lot.

Here a conscious connecting field of energy has the capability to affect the 'Other' as in both Sankhya and Māori philosophy. That profound thought recalls the David Bohm's [95] claim that your thought-feeling can uplift or deflate me; it can encourage or it can damage, because we are one. Yogic science trains our concentration to tune in until we are there at the deeper, internal levels of self - as connected to the 'Other' as a Māori participant also notices: And actually at the end of the day even though some of us weren't physically present, it isn't like where are the sisters? We're actually there [others agree]. We get caught up in the physical presence when the non-physical is stronger and it's just about calling on that. Say 'hey guys we need some support/ affi out here.' Invite something; I need help here [96-102].

These descriptions of a shared, internal heart-based, quantum communication between human beings and invisible others were given by many participants who were ordinary, well- functioning adults, engaged in modern family and working lives. Figure 1 outlines the interaction between an individual's material reality and the tuning in by thought and will to the quantum world and the 'Other' [103-105].

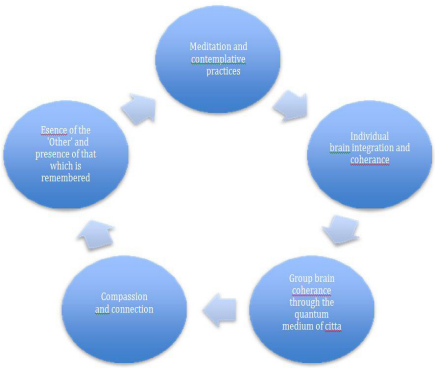

Figure 1: Individual practices and spiritual connections

Conclusion

The essence of spiritual brother-sisterhood appears to take us into self-transcendent thoughts about who we are. These stories invite us to dive into the potentiality contained within ourselves and our nervous systems as evolved structures capable of highly integrative processing enhanced through disciplined, regulated, time-tested practices such as asana, breathing, purification, meditation and attitudes of aroha/ love, and connection. The shared stories of lived experience of spiritual brotherhood/sisterhood from Māori and Raja Yoga practitioners suggests that a wider transcendent consciousness is being experienced by all of us in a natural way. The differences between the two communities are mainly of emphasis and centre on the Raja Yogic notions of the individual purity/ atman versus the importance of connectedness and whakapapa for Māori. Both traditions have gathered knowledge via direct observation, rational inference, and articulate cognition or recorded testimony and both have close resonances with activity in diverse brain circuits that allow cerebral synchronization, humeral regulation, and patterns of widely inclusive information processing [106-108].

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