

# PUTTING THE BUDDHISM/SCIENCE DIALOGUE ON A NEW FOOTING

CLIFFORD SARON, PHD, RESEARCH SCIENTIST,  
UC DAVIS CENTER FOR MIND AND BRAIN

## TOWARD CONTEMPLATIVE SCIENCE: FURTHER ISSUES AND MODELS IN THE SCIENTIFIC INVESTIGATION OF CONTEMPLATIVE PRACTICE



MANGALAM RESEARCH CENTER  
FOR BUDDHIST LANGUAGES

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## **Toward Contemplative Science: Issues and Models in the Scientific Investigation of Contemplative Practice**

*Clifford Saron, PhD.*

To focus on the transdisciplinary origins and potential of the current meeting, Saron shared the history of his personal involvement in the dialogue between science and Buddhism, and highlighted the contributions to his thinking of several individuals whose role was inspirational.

He recounted the drama of his first presentation to the Dalai Lama at the Mind and Life meeting in 1990, which he opened with a photograph of himself and Richard Davidson in electrode caps—an image that encapsulated how their personal identity was invested in this scientific method.

At that same meeting he met Francisco Varela, who influenced him profoundly. He quoted from an interview where Varela stated “Science, in its core, in its active living core, is pure contemplation. It has little or nothing to do with manipulation.” Saron interprets manipulation here as referring to a kind of scientific activism—however altruistic—that is motivated by a need to change prevailing conditions. While such needs may indeed improve the conditions of existence, they are not the core of science, which seeks an ever-refined description of our collective understanding of reality. Rather, they are more aligned with technology creation.

Philosopher Charles Taylor also attended an early Mind and Life meeting in 1992 and introduced the concept of the social imaginary—how a particular group imagines its social existence, with all of its interactions, expectations, and norms—which Saron refined for the present gathering into “disciplinary imaginaries” or “guild lifeworlds,” which members of different academic fields experience as reality rather than as social constructions, and which need to be brought into awareness for the goal of transdisciplinary *desiloization* to be successful. Saron suggested that participants should look for what is at stake in their colleagues’ point of view—what are their persistent questions, methods, and assumptions—and then turn that inquiry on themselves.

He defined the meeting’s process goal as “letting other disciplinary imaginaries infiltrate your sense of identity,” and noted the points made by John Dunne in his transdisciplinary workshops at the International Symposium of Contemplative Studies in November 2016, that this is not about aligning views seen through different lenses, but expanding one’s access to multiple lenses not typically relevant to the training of one’s own field. As a way of expanding our notions of the boundaries of separate disciplines, Saron also offered, after Evan Thompson, Gregory Bateson’s description of how a blind man’s stick is an extension of the pathways of his nervous system and thus part of his embodied self.

Saron’s encounter with Varela led to their collaboration in 1992, with Alan Wallace, Richard Davidson, Greg Simpson, and José Cabezón, using cognitive

neuroscience tools to investigate Tibetan mental training. The project involved the logistical challenges of bringing a modified lab to Tibetan monks living in stone meditation huts on Baghsu mountain near Dharamsala. There were also significant cross-cultural challenges,<sup>1</sup> illustrated by the monks interpreting catch trials as the scientists lying to them, and ridiculing the notion that the mind was located in the head and could be measured using an EEG cap.

In contrast, Saron's interactions with the Dalai Lama showed him to be surprisingly familiar with scientific thinking, and His Holiness's guidance has directly influenced the role of scientists in promoting Buddhist practices in a secular context. The subsequent exponential growth in mindfulness research can be seen as positive or as a bubble. Of more direct concern is the weakness of much of the science behind the understanding of mindfulness and meditation that has penetrated popular culture, including applications in business and elementary education.<sup>2</sup>

Saron noted what Evan Thompson has described as the modern mindfulness looping effect: the concept of inward-looking awareness and regulation of the individual mind is projected onto the brain, lending it a biological basis, which then feeds into the conceptualization that the task of mindfulness is the regulation of brain functions. This distortion leads to such things as teaching children to "down-regulate your amygdala" or biofeedback technologies designed to train attention that may be counterproductive. Technologies that claim to extract meaning from brainwaves promote a misguided "hegemonic methodological supremacy" though they may have prosocial uses even as they present ethical challenges.

In contrast, Saron described a study that suggested the potential of neuroscience for effective transdisciplinary collaboration, demonstrating how context affects our experience of the world around us in profound ways.<sup>3</sup> The EEG response to the same tactile stimulus of a puff of air on the subject's finger was shown to vary significantly with the simultaneous presentation of a visual image of another person's hand experiencing a gentle touch or the pain of a needle. The degree of activation in response to the painful image is highly correlated with self-reported measures of empathy, suggesting that the results may provide insight into the experience of burn-out as well as showing the utility of noninvasive brain electrical activity for studying neurophenomenology.

Saron then shared two videos that demonstrated the vast complexity of information to be processed in the study of the brain's functioning, and the distance that remains between accessible information and any understanding of perception or consciousness. A documentary clip on Jeff Lichtman's Human Connectome Project focused on the "huge gap in our knowledge of how brains work, largely because we have no idea what they are actually made up of at the finest level" and the task of mapping every single connection in the wiring diagram of how cells communicate with each other, which in the mouse brain involved 33,000 sections for each millimeter depth

of tissue. A second clip, from Christof Koch's study at the Allen Institute for Brain Science, showed the density of activity in a half millimeter of a mouse's visual cortex—a sample just 0.1% of the actual activity of a single neuron without taking into account its synaptic connections. These examples begin to indicate how the complete map of the functioning of the human brain will exceed our cognitive capacity in a kind of “event horizon of human knowledge.” It will require artificial intelligence to render this amount of data comprehensible, as well as decisions about what levels of knowledge suffice for what purposes, and what the long-term agenda of neuroscience may be.

As an example of effective transdisciplinary collaboration, Saron reported on an effort to provide a neurophenomenological description of multiple dimensions of mental development that are supported by mindfulness practices, in terms accessible to multiple disciplines including psychologists and religious scholars.<sup>4</sup> The resulting “mindfulness matrix” is a cube with its three axes being:

- object orientation (degree of sustained focus on a physical or mental object)
- dereification (recognition of thoughts as not substantial)
- meta-awareness (multiple levels of awareness, such as awareness of background elements while focused, or awareness of task sets)

Subsidiaries qualities that can be assigned to any space in the cube are:

- aperture, or breadth of focus
- clarity, as opposed to fatigue or dullness
- stability, measured as duration of focus, or the distance covered to restore lost focus
- mental effort

This matrix allows us to map the trajectories of expected outcomes of different practices, to organize experimental designs and tasks relevant to these dimensions, and ideally to serve as a foundation for developing a more complete model.

Finally, Saron provided an update on the Shamatha Project,<sup>5</sup> a longitudinal study he directs of Western Buddhist meditators that began in 2007 and was motivated in part by the cross-cultural difficulties of the 1992 research project on Baghsu mountain. The study tracked psychological and physiological changes that accompanied training in the regulation of attention and emotion through the traditional practices of Shamatha and the Four Immeasurables over two 3-month retreats taught by Alan Wallace.

Saron commented on context that is rarely reported formally: how fundraising requirements had influenced the study's design toward “the standard model narrative of the fit between the tools of science and Buddhist practice.” He noted, too, the effects of the demand characteristics of a retreat experience and of the aesthetics and supportive community of the retreat environment, which would likely not be reproduced in a different context.

Beyond the self-reported improvement on many psychological variables,<sup>6</sup> the study found 30% higher levels on the enzyme telomerase which repairs chromosome

damage indicative of cellular aging and mortality, among retreatants after three months compared to the control group. There was also a strong correlation between higher telomerase and a reported sense of purpose in life among the retreatants but not controls.<sup>7</sup>

A replication study<sup>8</sup> done recently at Spirit Rock Meditation Center showed a similar pattern of improved telomere length for retreatants and provided more detail on the effects of telomerase on telomere length. Relating telomere length to personality factors, individuals with higher levels of neuroticism and lower levels of agreeableness showed more improvement in telomere length than more well-adjusted individuals. This suggests, Saron conjectured, that the retreat environment, which is aesthetically pleasing and minimizes routine stress, allows one's inborn self-organizing capacity for restoration to manifest biochemically, but also points to the significance of individual differences in studies of contemplative practices.

The discussion began by elaborating on the relevance of the environmental context from several angles, and the possibility of isolating and controlling for contextual effects. Sylvia Boorstein related the introduction she offers on the first night of a retreat: that following the meditation instructions is secondary to submitting to the retreat conditions, and not strictly required to gain benefit from the experience. Frank Schuman pointed out that the issues of context called in question the very definition of a contemplative practice, if it is possible to practice meditation on the basis of an app in the midst of a modern Western lifestyle, without recourse to a teacher, a retreat environment, or a tradition shared by community. Michael Sheehy noted that the effect of environmental context on psychological states is covered by classical Buddhist instructions, with different settings recommended for different types of meditation.

The theme of transdisciplinary work was explored further, and how it is distinct from the more conventional understanding of interdisciplinary work. Beyond the issue of avoiding the hegemony of neuroscience, William Waldron noted that it is easy to import ideas from one theoretical system to another without full awareness of the implications of the shift of context—which occurred even in the transmission of Buddhism into China and the matching of concepts with Taoism; the alternative is to understand how particular concepts function within the imaginary of a given discipline, and the potential distortions that occur when scavenging from another discipline rather than entering into its systemic mode of thinking. Elena Antonova spoke of going a step beyond letting other disciplinary imaginaries infiltrate your sense of identity, and instead allowing the contact to destroy one's sense of identity in a way that may lead to entirely new methodologies, which Saron welcomed as a radically freeing and flexible approach.

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<sup>1</sup> Houshmand, Z. , A. Harrington , C. Saron and R.J. Davidson (2002), ‘Training the Mind: First Steps in a Cross-Cultural Collaboration in Neuroscientific Research’, in R.J. Davidson and A. Harrington , eds, *Visions of Compassion: Western Scientists and Tibetan Buddhists Examine Human Nature*, pp. 3–17 ( New York, NY: Oxford University Press ).

<sup>2</sup> Van Dam, N. T., van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W. Kerr, C. E., Gorchov, J., Fox, K. C. R., Field, B. A., Britton, W. B., Brefczynski-Lewis, J. A. & Meyer, D. E. (2017). Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation. *Perspectives in Psychological Science*. Sept 1:1745691617709589. <https://doi.org/10.1177/1745691617709589>

<sup>3</sup> Martínez-Jauand, M., González-Roldán, A. M., Muñoz, M. A., Sitges, C., Cifre, I., & Montoya, P. (2012). Somatosensory activity modulation during observation of others’ pain and touch. *Brain Research*, 1467, 48-55.

<sup>4</sup> Lutz, A., Jha, A. P., Dunne, J. D., & Saron, C. D. (2015). Investigating the phenomenological matrix of mindfulness-related practices from a neurocognitive perspective. *American Psychologist*, 70(7), 632-658.

<sup>5</sup> Saron, C. D. (2013). The Shamatha Project Adventure: A Personal Account of an Ambitious Meditation Study and its First Results. In: *Compassion: Bridging Theory and Practice*. T. Singer and M. Bolz (Eds). Munich, DE: Max Planck Society. A free eBook available at <http://www.compassion-training.org/>

<sup>6</sup> Sahdra, B. K., MacLean, K. A., Shaver, P. R., Ferrer, E., Rosenberg, E., Jacobs, T. L., Zanesco, A., Aichele, S., King, B., Bridwell, D., Lavy, S., Mangun, G. R., Wallace, B. A., & Saron, C. D. (2011). Enhanced response inhibition during intensive meditation predicts improvements in self-reported adaptive socioemotional functioning. *Emotion*, 11(2), 299- 312.

<sup>7</sup> Jacobs, T. L., Epel, E. S., Lin, J. Blackburn, E. H., Wolkowitz, O. M., Bridwell, D. A., Zanesco, A. P., Aichele, S. R., Sahdra, B. K., Maclean, K. A, King, B. G., Shaver, P. R., Rosenberg, E. L., Ferrer, E., Wallace, B. A. & Saron, C. D. (2011). Intensive meditation training, immune cell telomerase activity, and psychological mediators. *Psychoneuroendocrinology* 36, 664-681.

<sup>8</sup> Conklin, Q. A., King, B. G., Zanesco, A. P., Lin, J., Hamidi, A. B., Pokorny, J. J., Álvarez-López M. J., Cosín-Tomás, M., Huang, Kaliman, P., Epel, E., and Saron, C. D. (in press). Insight meditation and telomere biology: the effects of intensive retreat and the moderating role of personality. *Brain, Behavior & Immunity*