

# *Imag(in)ing the Buddhist Brain*

with Lorenza S. Colzato and Jonathan A. Silk, "Editorial Introduction"; Bernhard Hommel and Lorenza S. Colzato, "Religion as a Control Guide"; Florin Deleanu, "Agnostic Meditations on Buddhist Meditation"; Antonino Raffone et al., "Mindfulness and the Cognitive Neuroscience of Attention and Awareness"

## IMAG(IN)ING THE BUDDHIST BRAIN: EDITORIAL INTRODUCTION

by Lorenza S. Colzato and Jonathan A. Silk

*Abstract.* Buddhism has captured the imagination of many in the modern (Western) world. Recently, scientists have seemed eager to discover whether claims about Buddhist meditation can be verified experimentally. Brain research is beginning to produce concrete evidence that mental discipline and meditative practice can change the workings of the brain and allow practitioners to achieve different levels of awareness, as measurable for instance in reaction times to stimuli. The goal of this section of articles in *Zygon* is to address recent developments in this area. The contributions address a wide array of questions, although they certainly do not cover the whole ground of what one may consider "problems" of meditation. Yet, we believe that the issues addressed here have widespread implications and that they constitute a strong argument for the richness of the meditation domain.

*Keywords:* brain research; Buddhism; meditation

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What does science have to say about religion? Much discussion of this question seems to be mired in misunderstanding—beginning, perhaps, with basic disagreement about the signification of the key terms. For example, a number of recent books, seeming to assume that *religion* is equivalent to *theism*, then proceed to "prove" that a creator god is impossible, or

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unnecessary, or illogical, and conclude that religion is therefore “untrue.” Part of the problem no doubt stems from an arrogance that most would not openly acknowledge: Specialists in the natural sciences scoff—and rightly so—when those without specialist training make claims about their fields. For example, physicists pay no attention to those who assume that faster-than-light travel will be easy once we know the key. But some of these same scientists consider it perfectly natural to make declarations about religion based on half-remembered Sunday school lessons, as if religion (as an overall term for a class of human behavior) were wholly equivalent to the naive theism most familiar to them. Likewise, some from the religion side seem to view science as something that can bolster their legitimacy, a tool to be employed in the service of something that ultimately transcends it. There is a great need for something more than simple mutual education. Meaningful research requires intelligent and informed cooperation.

Buddhism (as if that were a single thing—another reification to add to the list) has captured the imagination of many in the Western world because, among other reasons, it is either perceived to be or promoted as being rational and (if one is honest about it) not annoyingly theistic. Little attention is given in such considerations to such problematic topics as traditional Buddhist views of cosmology—which assume a flat Earth, for example. Claims about reincarnation are also rarely taken seriously, perhaps because verification seems impossible. So a great deal of “the” Buddhist view of the world is *prima facie* considered (if considered at all) to be as beyond the realm of scientific interest as the study of angels.

Some of those interested in the mind, however, are more enthusiastic and ambitious. To put it simply (and perhaps not entirely objectively), they appear eager to discover whether claims about Buddhist meditation can be verified experimentally. But to say “those interested in the mind” is to be somewhat vague, because, at least so far, it is not primarily those interested in the *mind* who investigate Buddhist meditation but those interested in the *brain*. And here lurks a very serious chasm. The mind, one is compelled to admit, is not the same thing as the brain, and the relation between the mind and the brain may rightly be called one of the great fundamental mysteries of what it means to be human (if not animal as well). At the same time, there certainly is good reason to expect that investigations of the brain, and perhaps only such investigations, have the potential to tell us about what is going on in the mind. Toward this end, it is necessary to investigate both “normal” and “abnormal” states of mind. This is where Buddhism comes in, because a great many claims are made about the nature of mind based on (leaving aside for the moment the force of this expression) Buddhist meditation.

One of the first things that must be said is that meditation and Buddhism are not equivalent. Despite the popular impression, most traditional Buddhists (in Asia, rather than in Astoria) do not meditate; neither is there

necessarily anything particularly Buddhist about meditation. It is true that Buddhist authors, philosophers, and mystics have written much about meditation and theorized much about the functioning of the mind. Their theorizing is based on introspection—at best, for they also rely on traditional lore, which they cannot repudiate if they wish to remain within their tradition. This no doubt seriously constrains both what they can say (because in their public expressions they cannot contradict their received wisdom) and, through another mechanism altogether, what they are able to experience, even privately, because it is entirely reasonable to expect that they will process their experiences (if we grant for the purpose of argument the possibility of raw experience) through the framework of their expectations. An interesting question is what, if anything, brain science (or indeed even mind science) can learn from this.

Speaking from the side of Buddhist studies, one of the very first things to emphasize is that for progress to be made, specialists in the scientific study of brain function must cooperate with specialists in Buddhism. It is an unfortunate fact that a great deal that has been said or assumed about Buddhism by such scientists is based on unscientific and uninformed sources. It was one of the purposes of our meeting in Leiden on 20 March 2009 to bring together specialists in the study of Buddhism and those who study the brain. Of the presentations made on this occasion, two are published here in revised form; a third essay presents results of work by the co-organizer and the scholar who offered the “response” at the meeting. This work taken together cannot be said to be more than a beginning, but it is an important beginning.

How is it possible to study such a phenomenon as meditation scientifically? One key fact is that although meditation takes place in the body and the brain, what is most interesting about it is what takes place in the mind. Recent brain research is beginning to produce concrete evidence that mental discipline and meditative practice can change the workings of the brain and allow practitioners to achieve different levels of awareness, as measurable for instance in reaction times to stimuli. Transformed states of awareness traditionally have been understood in transcendent terms, even perhaps as something outside the world of physical reality and objective evaluation. (We should emphasize that, at least in traditional Buddhist contexts, and setting aside the complexities of tantric physiology, there has never been a rhetoric that identifies meditative and brain states; the concept of the latter simply did not exist.) The past few years, however, have seen researchers such as Antonino Raffone (University of Rome) and Heleen Slagter (University of Amsterdam), both of whom presented at our meeting, working toward a bridge between these mental experiences of meditation and the scientific language of high-frequency gamma waves and brain synchrony, or coordination.

Raffone and Slagter independently have measured the effects of meditation on the brain. Raffone and colleagues (2007) studied Buddhist monks and came to the conclusion that particular forms of meditation may lead to a lasting reorganization of brain activity. Slagter and colleagues (2007) discovered that after three months of meditating, individuals find it easier to divide their attention over stimuli in their environment. The difference was also visible in EEG scans. The conclusion was that through meditation individuals gained greater control over the limited capacity of their brain.

The articles in this section of *Zygon* address recent developments in this area, among them the questions: What claims do meditation traditions make? How might these claims be compatible with the methods and goals of brain science? What sorts of results can be verified by measuring effects of meditation on brain activity and cognitive functioning?

In the first article, Bernhard Hommel and Lorenza Colzato develop the idea that religion/meditation may provide a general orientation in leading one's life and, more specifically, provide a guidance function in systematically biasing decisions in the face of cognitive-control dilemmas. The authors assume that the selective reward that religious belief systems provide for rule-conforming behavior induces systematic biases in cognitive-control parameters that are functional in producing the wanted behavior. These biases serve as default values under uncertainty and affect performance in any task that shares cognitive-control operations with the religiously motivated rule-conforming behavior from which the biases originally developed. Such biases therefore can be unraveled and objectified by means of rather simple tasks that are relatively well understood with regard to the cognitive mechanisms upon which they draw. Such research contributes to the larger project in providing, among other things, clear confirmation that mental habits can have measurable effects on goal-oriented tasking.

Florin Deleanu, one of the world's leading specialists in the academic study of Buddhist meditation, introduces us to several varieties of Buddhist meditation according to the typologies of Buddhist traditions themselves. While acknowledging the undoubted utility of meditation, he is extremely cautious in evaluating the claims that have been made for meditative attainments by at least some of its modern promoters. He is particularly skeptical of whether, despite the possible influences that meditation may have on the brain, it is indeed capable—and especially: more capable than other means—of providing happiness, satisfaction, and understanding (“enlightenment”).

The last essay, by Raffone, Angela Tagini, and Narayanan Srinivasan, addresses the effect of mindfulness on the brain. The authors understand mindfulness as the mental ability to focus on immediate perception and to monitor the present moment with a state of open and nonjudgmental awareness. Descriptions of mindfulness and methods for cultivating it suggest

that mindfulness can be developed through meditation practice and that it enhances positive qualities such as awareness, insight, wisdom, and compassion. The authors focus on the relationships between mindfulness, with associated meditation practices, and the cognitive neuroscience of attention and awareness.

Taken together, the contributions in this section address a wide array of questions. They certainly do not cover the whole ground of what one may consider “problems” of meditation. Yet, we believe that the issues addressed in the essays have widespread implications and that they constitute a strong argument for the richness of the meditation domain. We trust that others will agree and will be motivated to address some of the many, many questions about meditation that these articles have left unanswered.

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