

BRAIN SCIENCE AND RELIGION

Some Asian Perspectives

Alena GOVOROUNOVA

Nanzan Institute for Religion and Culture

The Nanzan “Global Perspectives on Science and Spirituality” (GPSS) project sponsored its first international workshop in Taiwan in collaboration with the Center for the Study of Science and Religion at Fu Jen Catholic University in October 2007, on the theme “Consciousness, Brain Science, and Religion” (for details see http://gpss-japan.cocolog-nifty.com/blog/2008/01/the_inter-nation.html). A second international workshop was held in October 2008 in Seoul, Korea. The following summary of this Korea workshop was prepared by Alena Govorounova, who attended the workshop and served as chair of one of the sessions.

An international workshop on “Brain Science and Religion: Some Asian Perspectives,” co-sponsored by the Nanzan Institute for Religion and Culture and the Sogang University Institute for the Study of Religion, was held on 25 October 2008 at Sogang University in Seoul, South Korea. English was the working language. While limited to a single day of formal presentations, the workshop was very intense and highly interactive. The participants enjoyed lively discussions and stimulating debates, not only during but also before and after the formal workshop hours. Similar to the previous year’s workshop in Taiwan, organized by Nanzan in collaboration with the Center for the Study of Science and Religion at Fu Jen Catholic University, the Korea workshop was very international and diverse, attracting more than fifteen participants from Canada, the United States, Japan, South Korea, and Russia, who represented various research areas including Buddhist studies, religious studies, neuroscience, and brain science.

The meetings began with a reception at the Sogang University “Sky View Restaurant” on the evening of 24 October. Bernard Senecal, Director of the Institute for the Study of Religion, and other professors from Sogang University

warmly welcomed the participants, and all were able to have informal discussions in a convivial setting as a warm-up for the next day's workshop.

Workshop on "Brain Science and Religion"

INVITED PARTICIPANTS:

Alena Govorounova, *Nanzan Institute for Religion and Culture*

Huh Kyoong, *Ajou University, neurology*

Iriki Atsushi, *RIKEN, Brain Science*

Keel Hee-sung, *Sogang University (emeritus), theology & religious studies*

Kim Heup Young, *Kangnam University, systematic theology & religious studies*

Bernard Senecal, *Sogang University Institute for the Study of Religion*

Paul Swanson, *Nanzan Institute for Religion and Culture (GPSS, PI)*

Tanaka Keiji, *RIKEN, Brain Science*

William Waldron, *Middlebury College, cognitive science & Buddhism*

Opening Session, 25 October

Greetings: Fr. Bernard Senecal, *Sogang University*

Opening presentation: Paul Swanson, *Nanzan University*

Topic: "Brain Science and Religion: What Are the 'Big Questions'?"

Outline of the Workshop Goals and Agenda

The workshop began at 9 am with greetings and a speech by Bernard Senecal of Sogang University, who briefly outlined the primary focus and the structure of the workshop. It was followed by an opening presentation by Paul Swanson.

Swanson began by introducing the background for the Korea workshop, namely the project titled "Mind, Heart, and *Kokoro*: A Japanese Perspective" that is being directed by the Nanzan Institute for Religion and Culture within the framework of the broader project on "Global Perspectives on Science and Spirituality" (GPSS) sponsored by the John Templeton Foundation. Swanson highlighted three major problems relevant to the purpose of the present workshop: 1. What are the "big questions" in the dialogue between science and religion, especially with regard to brain science?; 2. What is the relationship between spirituality and the language of human experience?; 3. How can we overcome the conceptual controversy between the two opposite, delimiting, and unsatisfactory approaches to the mind-body problem: absolute dualism vs. total reductionism?

The “Big Questions”

Swanson proposed a variety of “big questions” for exploration at the workshop crucial to the science and religion dialogue in general, and for brain science in particular. He highlighted the following problems, which constitute the core agenda of the GPSS project: What is human consciousness? What does it mean to say ‘I’? What are the moral implications to be drawn from recent research in brain science? How did self-awareness emerge in human beings? And finally, What is mind? Spirit? Heart? *Kokoro*? What is the nature of these human experiences that involve self-awareness?

In addressing the relationship between spirituality and the language of human experience, Swanson elucidated a variety of meanings indicated by terms such as mind, heart, and *kokoro*, and presented a comparative analysis of the notion of “spirituality” as expressed in English, Chinese, Sanskrit, and Japanese languages.

The Mind-Body Problem: Two Polar Opposite Interpretations

In what followed, Swanson pointed out that the contemporary debates involving neuroscience and religion have been dominated by two rival interpretative approaches: absolute dualism vs. total reductionism. These represent two equally reductionist and epistemologically delimiting extremes: absolute dualism (originally stemming from Cartesian dualism) that extrapolates mind/spirit/soul and body/brain/matter as independently existing substances, and complete reductionism that reduces all human experience to merely the physical activity of the brain and the body. Swanson argued that the problem with the first standpoint is that if mind and body are indeed ontologically different and completely separate, then the question is, How do they interact? And if they do interact, then they share a ontological reality at some level, so how can they be considered independent substances? The problem with a reductionist stance, on the other hand, is that it invokes a mechanistic interpretation of humans as mere machines. In addition, a materialist-reductionist interpretation is not capable of accounting for the human experience of the “self” as an intentional agent, who thinks and acts in terms of “I,” from the first-person perspective. Even more problematic, if all human experience were to be reduced to physical events in the brain, then how do we deal with the problems of free will and moral responsibility?

Swanson proposed that one possible way to deal with this problem is to expand and modify our understanding of “matter”: from hard, cold, metallic, and impersonal towards more organic and humane, as some recent developments in the fields of robotics and artificial intelligence in Japan suggest. He suggested that this revised understanding of matter might further generate a



more plausible and non-offensive image of human beings as complex organic “machines” and allow for a more open-minded approach to “matter.”

A “Middle Path”?

The most important task that Swanson presented as a challenge for the workshop participants was to try to find a “third way” (or, in Buddhist terms, a “middle path”) that would go beyond the clash of opposite approaches towards the mind/body problem and open up the way for a new non-reductionist, non-dualistic understanding of human consciousness. In this regard, Swanson proposed some concrete questions for further discussion: “What can brain science tell us about consciousness, about religion, or about traditional understandings of mind, heart, soul, and *kokoro*?” “Do brain science and religion have anything to offer to each other?” “Do the findings of brain science affect your religious beliefs?” “What do your religious beliefs say to you as a scientist?”

Swanson also suggested that as the science-and-religion dialogue proceeds, our basic approach to the relationship between science and religion should be reformulated in more human-oriented, constructivist terms. That is to say, rather than inquiring, What can science learn from religion? or What can religion learn from science? the question should be rephrased as, What can we learn from science? and What can we learn from religion? Within this approach, science and religion are depicted not as epistemological rivals or radically opposite domains of human endeavor but as collaborators working for the common good. It is not about one or the other, it is not abstract science vs. abstract religion—it is a conversation of human beings interested in both science and religion.

Where do we go from here?

Finally, Swanson offered potential questions for future exploration of the present dialogue between brain science and spirituality: Where do we go from here? What are the possibilities for future collaboration, specifically in the areas of brain science and spirituality? Would it be more constructive to use the intentionally more open term “brain science” (as distinct from neuroscience) in future discussions between science and spirituality? Perhaps “brain science,” with its deeper implications for broader humanities, will offer a more inclusive approach to consciousness and help avoid materialistic reductionism?

Opening Discussion

In response to Swanson’s challenge, the participants contemplated the possibility of elaborating a “third way” or a “middle path” for the resolution of the mind-body problem from the perspectives of Christian theology, Buddhism, intellectual history, and neuroscience.

*Soul, Mind, Consciousness:**Conceptual, Philosophical, and Neurobiological Genesis*

First, Keel Hee-sung clarified that there is a general consensus among contemporary theologians that mind-body dualism was introduced into Christian theology from Greek Platonic sources during the Early Christian period, and that it does not reflect the biblical anthropological interpretation of the human subject. On the other hand, some biblical texts and other theological sources, such as accounts of the lives of saints, include many references to the detachability of a soul from a body and the survival of an eternal soul. Theologically, soul-body dualism was developed by Thomas Aquinas, who referred to a soul as a “form of a body” and clearly recognized the immortality of a certain part of a human psyche. While there are numerous theological references to “intermediate states of a soul” between physical death and resurrection, biblical anthropology speaks of a final resurrection in a bodily form and thus reaffirms the significance of a body over soul. A theological challenge here would be to explain the intrinsic significance of a soul. As Keel articulated it, “What can a soul add to the blessedness of a body?” According to Keel, Christian anthropological “soul discourse” remains ambiguous, and none of the above theological interpretations may count as a “third way” that would satisfactorily overcome the persistent controversy between dualism and reductionism.

A further discussion revolved around the questions, What is a “form of a body”? Specifically, what does it really mean in Thomistic theology? Can it be understood in terms of top-down causality, meaning that mind/consciousness

has causal efficacy on a material body? And if consciousness (or soul) indeed has some kind of causal efficacy on a material body, does it mean that it has some informative teleological influence? If yes, then how does this teleologically-driven ‘form of a body’ emerge? Can the emergence theory satisfactorily account for the existence of a spiritual element (reflective self-awareness) in human consciousness? Does a spiritual element emerge along with human organic evolution? Why does this spiritual element emerge? Where was it in the beginning? Does it emerge from a physical element (which would bring us back again to reductionism)? Otherwise, can we say that a spiritual element has always been present in matter but emerged only under certain physical conditions? In summary, the participants expressed dissatisfaction with the emergence theory as it evidently begs the “whys,” “whence,” and “hows” of the genesis of human consciousness—all these disturbing teleological questions to which we seek answers. It was concluded that, even if we admit that the recently-popular “emergence theory” offers many interesting productive solutions to some of the particulars of the problem of the genesis of human consciousness, it cannot qualify for a “third way” to resolve the contemporary controversy between reductionism and dualism.

Tanaka Keiji suggested that a “monitor system” in the association area in the pre-frontal cortex of the brain might qualify as a way to explain the evolutionary emergence of an independent human consciousness (that is, an ability to monitor one’s actions and reflect on them *a posteriori*). However, he also admitted that while this hypothesis can partially explain why we have an illusion that human intellect works independently (hence, the mind/body problem), overall, the “monitor system” theory cannot account for the complexity of human emotions in the *kokoro* (soul).

Further questions were raised regarding the historical origins of the concepts of “mind,” “soul,” or the “spiritual element in humans” in ancient civilizations and their first historical records in ancient sacred texts. When and how did these conceptualizations of human spirituality first appear in ancient Egypt, Greece, or India, and what were their cognitive-psychological, socio-cultural, and etymological roots? Questions came up as to whether the emergence of consciousness in prehistoric humans was linked to their awareness of individual death or whether there was a spark in the brain due to some other reason. When did conceptual formulations of individual death, afterlife, and the immortality of the soul historically emerge? How far into ancient history can we go to find answers to these questions of origin?

In summary, the opening discussion was primarily concerned with the specifying of working terminology, clarifying the distinction between cognitive dualism (mind-body dualism) and substantive dualism (soul-body dualism), envisioning or eliminating various interpretative models for the genesis

of consciousness, and basically setting the direction and the parameters for the overall development of the workshop. The conclusion of the discussion was open-ended: a “third way” has yet to be discovered. As William Waldron put it, “we do not yet know how to conceive of consciousness as independent of the body without making it sound like a kind of dualism, and we do not know how to conceive of consciousness as being dependent on the body without making it sound like a kind of reductionism.” Most of the questions raised during the opening discussion were left for further exploration.

Session 1. Science and Religion in Korea

First Speaker: Kim Heup Young, *Kangnam University*

Topic: “An East Asian Perspective in Science and Religion: Towards a Triologue of Humility (Sciences, Theologies, and Asian Religions)”

The context: Asian Christianity

The first session opened with a presentation by Kim Heup Young of Kangnam University, who introduced his perspective on the relationship between science, religion, and spirituality in South Korea and the broader East Asian region. The session was chaired by Keel Hee-sung (holder of the Roche Chair for Interreligious Research at the Nanzan Institute from October 2006 to August 2007).

In his presentation, Kim analyzed the relationship between science and religion from both Western European as well as East Asian perspectives. He challenged the entire notion of “Western Christianity” and demonstrated that, despite a common assumption to the contrary, Christianity is not a Euro-American but an intrinsically Asian phenomenon, as it originated in the Middle East. Moreover, during the last century the Christian center of gravity has shifted from Europe towards Africa, Latin America, and Asia, and the religious map of Christianity has dramatically changed.

The Myth of “Bridge-Building”

Kim also argued that the use of a “bridge-building” metaphor by Western theologians to refer to the relationship between science and religion appears as a perplexing paradox in the eyes of Asian Christians. Historically, it was the natural sciences and modern technology that attracted Asian people to Western Christianity when missionaries first came to the region, and ever since then, science has been associated with Christianity in the minds of Asian people. Furthermore, East Asians in general and East Asian theologians in particular see both Western Christianity as well as Western science as interrelated hegemonic discourses perpetuating and justifying Western colonialism and cultural imperi-

alism. In this respect, it is no surprise that a commonly utilized “bridge-building” metaphor appears baffling and misleading to Asian Christian theologians.

The Third Epoch of Christianity

Kim also indicated that “Eurocentric myopia” inherent in Western theological discourse fails to acknowledge the profoundly perplexing diversity of religious understanding, and described a new post-colonialist reawakening of Asian Christian theologians to the existence of originally East Asian religious voices as “The Third Epoch of Christianity.” In other words, there is an ecumenical interreligious movement striving to bring all religious systems (including Christianity, Buddhism, Daoism, Confucianism, T’ai-chi, and indigenous religions) to one common denominator. He emphasized the fact that within this movement, “apologetic and dogmatic models of theism are inappropriate, anachronistic, and backward” and called for escaping from Christian theism as a tool for the perpetuation of Western cultural imperialism, political plots for evangelism, and Christian hegemony. Kim expressed his concern that apologetics for Christian theism still prevails in the dialogue between science and religion, as is evident in the works of Ian Barbour and John Polkinghorne, and called for an interreligious imperative as an alternative paradigm of dialogue.

The Interreligious Imperative

According to Kim, more appropriate methodological paradigms for the integration of science and religion can be developed within a “humble approach of interreligious dialogue”—or rather, a “trialogue of humility.” He insisted that a triologue of humility engaging Christian theologies, Asian religions, and natural sciences, “has the greatest potential to enhance and globalize the dialogue between religions and sciences.” This triologue can be construed in two methodological stages: “a descriptive-comparative stage,” referring to an epistemological modesty in describing the others’ religious views; and “a normative-constructive stage,” referring to a freedom to do constructive theology within the above framework of “faithful agnosticism,” rooted in deep humility and respect for the views of others.

The Method: A Trilogue of Humility

Kim further developed his notion of “the triologue of humility” within the broader framework of what he called “the ortho-praxis of humanization”—that is, practical application of spiritual wisdom (Dao) of how to be fully human. The significance of the East Asian worldview, according to Kim, is that it focuses on the concrete embodiment of practical wisdom in human affairs, as opposed to the Western theological discourse trapped in “glorified intellectual mind games” and “speculative postulation of unverifiable supernatural knowledge.” The goal

of both sciences and religions, as Kim emphasized, is a realization of the full potential of humanity, and this realization of human potential can be achieved within the hermeneutics of the human person, not within an abstract sphere of metaphysical contemplations.

Locus of the Trilogue: The Wisdom (Dao) of Humanization

Kim suggested that Neo-Confucianism provides the way to attain the embodiment of the Dao through religious practices of self-cultivation. It is “an ideal locus for the dialogue between science and religion” since the common human quest for the Dao is in “cultivating and sanctifying our religious and scientific knowledge.”

The Content: Some Preliminary Suggestions

Preliminary suggestions for the future development of the multireligious “trialogue of humility” that would progress beyond current limitations of the Western Christian framework include the following:

1. The primary locus of the dialogue between religion and the sciences should not be theoretical metaphysics (knowledge) but with the Dao (way) of life (wisdom) in the common quest for a new cosmic humanity through mutual self-transformation, self-cultivation, and sanctification;
2. The conservative doctrines of a personal God and divine omnipotence as well as theological conceptions of human relations to a personal God such



as kenosis or process theology's "becoming," which rely on the essentialist, substantialist understandings of the Divine, are no longer suitable counterparts in the science-and-religion dialogue as they still retain vestiges of dualism. Instead, as the reality of Non-Being is becoming more plausible both in the new physics and Christian theology, the East Asian notions of nothingness, vacuity, and emptiness, as well as the conception of God as "absolute nothingness" appear to constitute a more promising theological strategy for the science-and-religion dialogue;

3. The traditional Christian notion of linear time and the logic of causality in Western thought still prevalent in the dialogue between science and religion should be scrutinized and re-evaluated in the light of the new physics and the East Asian understanding of non-linear "synchronicity";
4. The traditional Christian (or Greek) understanding of the term "nature" is problematic because it bears a pejorative connotation inherited within hierarchical Western dualism between the supernatural and the natural. Instead, it is worthwhile considering profound Daoist conceptualizations of nature, which bear the connotation of "self-so," "spontaneity," or "naturalness," as in the Daoist philosophy of *wu-wei* (cf. "let it be itself"). This Daoist understanding of nature as "self-so" must be integrated into the Christian "theology of nature" in order to clarify the ambiguous English term "nature" and to restore the original biblical understanding of nature in terms of "God's good creation" that had been lost in Gnosticism;
5. This "self-so" perspective marks a fundamental shift in attitude towards "nature" as an "organismic" (organic + cosmic) wholeness within which everything is interconnected in a web of life. Within this Neo-Confucian paradigm of participation and appropriateness, responsible participants appropriately respond to the interconnected whole in harmony with the "theanthropocosmic" (theos + anthropos + cosmos) trajectory (the Dao). This is a fundamentally different approach from that of the Western paradigm of domination and control.

In summary, Kim argued that the triologue of humility between natural sciences, Christian theologies, and Asian religions should be based not on the strife (Western) model of dialectical dualism but on the harmony (Eastern) model of triological holism as it metaphorically appears in the symbol of the Triune Great Ultimate (T'ai-chi). This Neo-Confucian vision of organismic holism that conceives of the triadic communion of heaven, Earth, and humanity, is ecologically more fitting and arguably more congruent with the findings of contemporary areas of scientific inquiry, such as quantum physics, chaos theory, complex systems, self-organization, and information systems. In conclusion, Kim suggested that this new vision for the potential merging of sciences and religions within

the paradigm of trialogical holism will make a fascinating topic for future discussion.

Discussion

Kim's presentation sparked a vibrant discussion, which evolved along two parallel, mutually intertwined directions, one concerning the peculiar nature and originality of the East Asian theological discourse (in contrast to that of the West) upon which Kim built his "humble paradigm of interreligious dialogue" and the other regarding a particular impact of East Asian theology on the future development of the dialogue between science and spirituality. Most importantly, the participants called for a deeper analysis of the new bridge-building paradigm of "interreligious dialogue" proposed by Kim and its potential contribution to future research in neuroscience.

What is unique about East Asian Theological Discourse?

In the first place, a number of concerns were expressed regarding the legitimacy of the comparative religious approach employed by Kim in his work: Is the holistic interreligious paradigm proposed by Kim culturally sensitive enough? Does it not perhaps carry the risk of undermining the uniqueness of particular religious traditions and will instead spark a new antagonism between them? Is it legitimate to ignore fundamental conceptual differences between various religious beliefs and theological systems and unify them under a universalistic umbrella? Where is the line between a constructivist interreligious integration and a sweeping radical universalism? Or, maybe, certain generalizations are inevitable in any attempt to do comparative religious analysis? Finally, the participants inquired in more detail as to what is unique about East Asian theological discourse and how it can compensate for the fallacies and failures of its Western counterpart.

In response, Kim challenged the participants to rethink the ambiguous distinction between East and West and to try to strip off some negative connotations that this artificially-constructed dichotomy has acquired, particularly in the Western world. In this light, Kim suggested that the peculiar nature of East Asian theological discourse is that it is geared towards practical wisdom in concrete human affairs as opposed to abstract metaphysical contemplations or flimsy fixations on the supernatural. Kim argued that the true distinction between Western and Eastern world views lies in the fact that in general, the East Asian world view does not emphasize the dichotomy between the natural and the supernatural as much as the Western world view. Contrary to Western interpretation, naturalism is very spiritual in East Asian understanding—and while very elusive and ephemeral, nature has a profound sense. Dao is an embodiment

of the delegation of heavenly directionality into everyday practice and the role of humans is to discern the direction of heaven for practical application. The original meaning of “nature” in Daoism and Confucianism thus helps overcome the duality of the natural and the supernatural in East Asian spirituality. This orientation towards practical wisdom in East Asia is exactly what allows for the successful employment of a conceptual bridge-building paradigm and the integration of commonalities from among different religious systems for mutual enrichment and strength.

The Impact of East Asian Theology on the Science and Religion Dialogue

Waldron further developed the idea that the Western world view is trapped within the dichotomy of the natural vs. the supernatural, which is based on the assumption that the natural is purely material. However, this Western dichotomy appears to be of little use in the dialogue between science and spirituality. In the East Asian world view, on the other hand, this dichotomy does not seem to carry so much weight since the natural is not perceived as purely material but as including the totality of human experiences. Therefore, there has been a lot of interest recently in getting away from the paradigm of Western dichotomy and trying to find the ways in which scientific laws of experience can engage in a fuller dialogue with religious modes of experience.

The above-mentioned pro-East-Asian reformulations of the dialogue between science and religion, while having been very enthusiastically received, still did not find full consensus among the participants. Among the objections raised were those regarding the outspokenly anti-metaphysical, “this-worldly-oriented,” persistently pragmatic scenarios of the future development of the science and religion dialogue envisioned by Kim. The participants expressed doubts that getting away from metaphysical anthropology and leaving out all references to the supernatural, as Kim suggested, would undermine the entire significance of the role of religion in the science and religion dialogue. The fundamental question of religious anthropology—whether there is indeed an authentically non-material spiritual element in a human being—still stands and cannot be ignored.

Finally, Keel suggested that the potential for the most substantial East Asian contribution to the mind-body problem lies in the *qi* (氣) cosmology that recognizes the existence of authentically spiritual (yet physically manifest) life-sustaining energy in a human being. However, the question of how we really understand *qi* and what potential *qi* anthropology has for resolving the age-old mind-body problem still needs to be explored. In summary, the conclusion of the discussion was that there is no easy way out of the present controversy and we are still at the very beginning of this journey.

Second speaker: Huh Kyoong, *Ajou University Medical Center*

Topic: "What Is the Brain? Searching for the New Horizons in Neuroscience"

The second lecture of the first session was given by Huh Kyoong from Ajou University Medical Center in South Korea. Huh elucidated the core concepts of mainstream neuroscience and introduced the key problems that neuroscientific research on consciousness faces today. In doing so, he also expressed his yearning for a fundamentally new paradigm that would help constructively integrate neuroscientific and religious understandings of consciousness.

Core Challenges of Contemporary Neuroscience

When explaining the core challenges of contemporary neuroscience, Huh first comprehensively explained the place neuroscience occupies as a field within the hierarchy of contemporary sciences. He schematically categorized all sciences into three major categories: macrocosms sciences (dealing with objects of the universe bigger than the Earth); microcosmic sciences (dealing with particles that construct the universe (atoms, molecules, and so on); and mesocosmic sciences (dealing with the phenomenon of human existence in the universe: human sciences, anthropomorphic sciences, and so on) Huh went on to suggest that neuroscience as a part of biology falls under the mesocosmic category.

Huh's basic argument was that there is a significant gap between macro, micro, and mesosciences and that many delimitations and challenges that neuroscience experiences today stem from that very disintegration between sciences. Despite the fact that various scientific fields are interconnected by similar principles and laws, they are still trapped within their local autonomy. Having been positioned as a mesoscience within this hierarchical structure, neuroscience is limited by the laws of Newtonian physics and an inherently Newtonian interpretation of reality. A philosophical foundation of Newtonian science is to assume "a reality": reality is perceived as fixed, things exist as independent from an observer; energy, time, and matter are considered fixed entities. In mesosciences, physical laws are simple, but in macrosociences or microsociences this logic of simplicity does not apply. When we have to deal with the complex phenomena of the universe, such as a human brain, we have to be free of Newtonian physics. What appears to be the most fundamental problem for neuroscience as a field today is that it has been treated—along with biology—as a typical Newtonian science.

According to Huh, the human brain—a consciousness generator—is a dynamic complex system that cannot be understood within the limits of Newtonian science. The brain is not a fixed electrical circuit; it is changing, it is making cells, cells are dying, and new cells are produced again. We call this plasticity. Currently, we cannot account for such complex dynamic processes as

those manifested in the human brain, because within the limits of Newtonian mesocosmos we are doing a science of simplicity. What we need, however, is a science of complexity.

Huh introduced a number of the other challenges that neuroscience is facing. The subject of neuroscience is very unique. It has to deal with abstract matters like consciousness, emotion, cognition, intelligence, and psychosis, and provide scientific insight into everyday personal human experiences. In dealing with chemistry or biology, for instance, one has to deal with material objects like organic masses, but things such as mentality, emotions, and consciousness still remain abstract notions. On the one hand, neuroscience is a hard science but, on the other hand, because the brain is concerned with communication, it has a very strong meta-scientific context and needs to be integrated with philosophy, theology, psychology, and religion. In fact, a gradual interdisciplinary integration of neuroscience with other natural sciences and human sciences is fast becoming a looming reality: very recently we have observed the emergence of a variety of new fields, such as neuro-philosophy, neuro-theology, neuro-economy, and neuro-anthropology, among others, which are concerned with discovering the neurobiological basis of human behavior and experiences in all walks of life.

Huh admitted, however, that while neuroscience can partially explain some particular mechanisms at work in human behavior and experiences, its biggest challenge—the explanation of the phenomenon of consciousness *per se*—still remains unresolved. What is consciousness? Is it a state of wakefulness? A sensory awareness? Quali of experience? Traditionally, it has been interpreted from many different angles: often consciousness is skeptically perceived as an illusion, a mystery, or an abnormality. At other times it is taken for granted as an intrinsic manifestation of reality, with a consequent conclusion, why bother? It is also sometimes seen as a natural phenomenon, the particulars of which will be discovered in the future, like some kind of DNA of consciousness. One popular theory is a block-building theory, which is similar to the Buddhist interpretation of consciousness. It explains consciousness as a set of emotions, perceptions, qualia, and other “blocks”—a combination of sensory stimulations and consequent responses. But if we imagine that a human subject is completely devoid of sensory stimulation, does it mean that he or she has no consciousness?

Huh concluded here that no matter how hard we try to “explain away” the mystery of human consciousness in materialistic terms, there is still something inescapably “first person” about the human experience of oneself. Who is choosing food at McDonalds? Is it I? Is it my brain doing it? All these questions of qualia, agency, and freedom in the interpretation of human consciousness never cease to intrigue us.

Is the Brain a Quantum Machine?

What can neuroscience do to decode the mystery of consciousness? Currently neuroscience tries to discover neuro-correlates of consciousness, using anatomical, electrophysiological, biochemical, and fMRI approaches. But neuroscience as a field still faces many limitations: technological, conceptual, ontological, and existential. Why is there so much difficulty? The problem lies in its Newtonian philosophical foundation, and unless contemporary neuroscience transcends the limitations of a Newtonian interpretation of reality, it will remain materialistic and reductionist.

How can neuroscience break the boundaries of the Newtonian mesocosmos? Huh suggested that the alternative lies in quantum physics: first of all, there is a notion of a radical need of an observer in quantum theory and this is where consciousness becomes a reality-bound entity. Other key concepts of quantum physics, such as non-locality and a non-computational approach to reality, are also fascinating from the perspective of neuroscience as they open the door into the universe of non-fixed entities and phenomena.

In the light of quantum theory, Huh proposed to reformulate the research objective for neuroscience in a drastic new way: “Is the brain a quantum machine?” He indicated that some non-mainstream neuroscientists are already exploring this possibility, but their research still remains marginal. Nevertheless, the project of the integration of neuroscience and quantum physics obviously has great potential. Within this non-Newtonian approach to reality, neuroscientists will find far greater flexibility and freedom, and will be able to unprecedentedly expand the boundaries of their research on human consciousness.

When Science Meets Religion

Huh also suggested that while science and religion are seemingly two separate realms, there are still two major intersections where science and religion inevitably cross: the ultimate questions of existence and ethical dilemmas. Whenever science reaches its conceptual or ontological limits, it turns to religion. In the private domain of life, religion fills in the gaps by ascribing ultimate meaning and value to individual human existence. In the public sphere, religion helps vocalize ethical dilemmas posed by the recent research in robotics, bioengineering, and biomedical sciences. In the face of a looming biotechnological revolution, the role of religion is to offer a healthy antidote to the philosophies of neo-eugenics, trans-humanism, and other destructive ideologies that support the biological manipulation of a species.

In conclusion, Huh proposed that religion may be called “a science of totality,” because it helps bring into perspective the notion of “ultimate reality.” Contemporary science has its own boundaries, which need to be expanded if

science is to progress, and employing a non-Newtonian paradigm for neuroscientific research appears to be the way to do so.

How can this new paradigm be practically employed and become applicable for an extended dialogue between neuroscience and religion? Huh suggested that one way for non-Newtonian sciences and human sciences to find a common language is to turn to Whiteheadian metaphysics, information theory, semiotics, and biosemiotics—all of which are concerned with the mediation of information and processual phenomena. Both human sciences and hard sciences have to come to the realization that fundamental reality is not matter but information: everything in the universe is concerned with computation and the exchange of meaning. Energy and matter in essence are information—not fixed entities, and, in fact, the universe per se is a gigantic quantum computer.

Lastly, Huh demonstrated that this new paradigm also opens the way for Buddhism to merge with the natural sciences because Buddhism, too, gives us a fresh non-conventional perspective on reality. Buddhist epistemology is very challenging and can be productively incorporated into contemporary neuroscience, together with the Daoist understanding of nature in flux and the Confucian emphasis on harmony as the essence of the universe and human existence. All of these can broaden the boundaries of contemporary science in general and expand the current epistemological paradigm for neuroscience in particular.

Discussion

“Human Continuum” from the Brain Death Perspective

As the discussion began, Huh was first asked to clarify once again the unique perspective on reality that quantum theory provides and the role it can play in the integration of science and religion. Huh explained in more detail some principles of causality and non-locality in quantum theory and focused particularly on the paradox of immediate interrelatedness of separate particles in quantum physics, as opposed to the Newtonian interpretation of separate particles as independent entities. He specified that this revised understanding of reality through the prism of quantum theory may help deconstruct the Cartesian dichotomous paradigm predominant in our interpretation of consciousness.

As the discussion on the definition of human consciousness unfolded, the participants addressed the relationship between the human brain (as a material organic mass) and consciousness (as a non-material state of self-awareness) from the perspective of the “brain death” controversy. The participants discussed the differences between the Korean and Japanese legal definitions of “brain death” and the resulting different attitudes in actual medical practices in these countries. A strong emphasis was placed on the fact that our understanding

of brain and consciousness is intrinsically intertwined with the way we define “brain death,” and moreover, our interpretation of “brain death” is directly connected to our ultimate definition of what it means to be human.

Did My Neurons Make Me Do It?

Huh talked about several new fields that have recently emerged on the intersections of neuroscience and human sciences: neuro-philosophy, neuro-theology, neuro-economics, and neuro-anthropology. During the discussion this topic was again brought up and addressed in more depth. A particular interest was sparked by Swanson, who pointed out the potential implications of neuro-law for the current science and religion dialogue, and the revised interpretation of free will and moral responsibility in the light of neurobiological determinism: if neurobiological determinism is indeed true, then how can anyone be held responsible for a crime? To borrow an expression from the title of the book by theologian Nancy Murphy, “Did my neurons make me do it?”

Interesting insights were made in regard to various religious interpretations of a “crime.” Iriki Atsushi noted that while in the human legal system one is judged by behaviorally evident actions, in some religious systems, like Christianity, divine judgment also concerns one’s thoughts, and not actions alone. In this sense, there is no distinction between inner thoughts, hidden motives, and actual actions from the point of view of (a) God. A concept of conscienceness or self-reflection as one’s inner judge, one’s own sense of self-awareness, and a moral compass is also broadly developed there.

In Buddhism this “actuality of thought” is elaborated to an even greater degree: negative thoughts directly produce negative karma, and a subject does not even have to be aware of having these thoughts or the degree of their negativity, since thoughts themselves function as causal conditioning factors in dependent origination. A debate revolved around the issue of whether free will is involved in karmic law. On the one hand, in Pali sutras Buddha defines karma as intentional and emphasizes the importance of volitional factors for the cycle of dependent origination; on the other hand, he also identifies all cognitive processes as happening so fast that it almost seems as if we have no free will. From the cognitive psychology perspective, too, volitional formations in the brain happen so fast that they are not actually happening at the fully conscious level. Only if a person practices mindful meditation can he or she consciously identify those processes. The question remains: What can be clearly defined as a Buddhist understanding of free will?

The Future of the Neuroscience of Spirituality

In conclusion, the participants tried to envision the future development of the dialogue between neuroscience and religion. “How many neuroscientists would

be truly motivated to be engaged in an interdisciplinary study on consciousness, which would include an authentically religious or theological perspective?” the discussants inquired. Huh’s answer was, “Very few.”

And to the question, “Would neuroscience be open to the study of “supernatural” phenomena such as *qi*, for example?” he replied, “Probably not.” Huh explained that there is still a major lack of methodologies, interpretative frameworks, and legitimate statistical evidence of spiritual phenomena, and it will take a lot of work before neuroscience and religious spirituality can truly effectively collaborate on the scientific level. Nevertheless, as Huh insisted repeatedly, despite all current controversies and prejudices, neuroscience will undoubtedly be at the leading edge in future dialogue between science and religion, since it is most directly concerned with the discovery of the scientific underpinnings of human spirituality.

Session 2. Cognitive Science and Buddhism

Speaker: William Waldron, *Middlebury College, USA*

Topic: “Cognitive Science and Buddhism: A Buddhist Philosophical Critique of Naturalizing Mind”

Following the lunch break, the second session began with the presentation by William Waldron of Middlebury College, chaired by Alena Govorounova. The basic thesis of Waldron’s presentation was that the human mind is “involved in a complex web of causal interrelations” with the environment and that “any attempt to isolate the mind as a distinct entity or essence leads to incoherencies and intractable problems of explanation.” The notorious body/mind problem is rooted in Cartesian substance dualism, where the “mental” and the “material” parts of experience are posited as ontologically separate and “as long as we see the material elements as completely insentient, and the sentient elements as completely immaterial, we are unable to imagine any relation or interaction between them, which prevents us from “solving” the mind/body problem, and non-reductively relating the varieties of human experience, such as spiritual experience, to the body/brain.”

Waldron proposed that Buddhist modes of analyzing experience are philosophically relevant to the present discussion because they focus on the causal interaction between mind and body rather than on their ontological distinction. In what followed, he comprehensively demonstrated how and why this Buddhist anti-essentialism is commensurate with the contemporary scientific approaches to consciousness.

Buddhist Critiques of Essentialism

In the first part of his presentation, Waldron discussed Buddhist critiques of essentialism developed within two major schools of Indian Buddhist philosophy: Madhyamaka and Yogācāra. He demonstrated that the concepts of “essence,” “substance,” “unchanging nature,” or “intrinsicity” are alien to their analyses of consciousness precisely because the notion of an unchanging essence, existing independently in its own right, cannot be a part of an integrated pattern of causal interaction. Consequently, from the Buddhist perspective, mind or consciousness, like any other phenomena, is better seen as part of causal interaction than “an essential substance existing in solipsistic isolation.”

Waldron also drew parallels between the Buddhist notion of *prajñapti* or “conventional designations” and modern scientific nominalist interpretations (advocated by Karl Popper, among others), meaning that both Buddhism and contemporary science use terms such as “entities” and their “natures” simply as “convenient names for concatenations of conditions.” In reality there are no “entities” or “natures”—these terms are conventional definitions utilized in science and in Buddhism to “cut a long story short.” Waldron argued that modern science—particularly with the advent of Darwinian evolution—has been undergoing a fundamental shift from “essentialist thinking” towards patterns of causal interaction, which is one of the reasons why contemporary scientific thought resonates so deeply with Buddhist anti-essentialism.

Finally, Waldron elucidated spiritual dimensions of the Buddhist critiques of essentialism. He introduced the notion of *abhūta-parikalpita*, elaborated by Yogācārins (4–7th c. CE), which refers to our tendency to falsely perceive the subjective dimension of experience as separable from the objective dimension. The spiritual ramifications of this epistemological self-delusion are that we tend to ignore the effects of our actions (karma) upon the larger networks of the world.

Materialism and Qualia as Cartesian Descendants

Despite the fact that modern scientific thought has basically banished essentialism, most scientific and philosophical approaches to mind and consciousness still seem to accept certain aspects of substantialist thinking inherited from Cartesian dualism. As Waldron put it, “the arena of this dualism has shifted from the relatively gross level of mind and body dualism to the more subtle level of brain and experience, and neurons and qualia, roughly speaking—from ontology to epistemology.”

This is how the ontological dilemma of mind/body dualism has been substituted by its more sophisticated epistemological alternative: on the one hand, eliminative materialism interprets qualia as purely epiphenomenal and insists

that all human desires, intentions, and feelings are mere by-products of material processes and must be reduced to their material substrates. On the other hand, the opposing theory of intrinsic subjectivity states that the mind is intrinsically “about something,” it is intrinsically intentional and possesses its own nature and properties independent of its material substrate. But again, Waldron objected, if our qualia are truly independent of any material basis, they would not be involved in causal interactions between mind and body. Thus, he concluded, both intrinsic subjectivity and materialist objectivity appear to be equally epistemologically incoherent and the unbridgeable gap between subjectivism and objectivism remains.

How This Critique Might Apply to Meditation Studies

In the last part of his presentation, Waldron expressed some of his cautionary concerns regarding recent neuroscientific attempts to discover “neural correlates of consciousness” in the investigation of meditation practices. Instead of effectively deconstructing the subject-object dichotomy—as expected—neuroscientific research on meditative practices often appears to reinforce and enshrine epistemological dualism. This is particularly evident in the attempts of neuroscientists to take third-person, neurological accounts of the brain, and correlate them with the first-person, “subjective” accounts of experience, as if they both were able to describe reality “as it is.”

According to Waldron, there are two major problems with this approach. First, scientific knowledge in general and neuroscientific knowledge in particular must be questioned because they “are driven, inspired, and constrained by human intelligence and ingenuity.” Simply put, science is, first and foremost, a human construct, and “the interdependence between subject and object is not negated by our methodological objectivism.” Secondly, treating subjective interpretations given by Buddhist meditators as literal descriptions of the first-person “meditative experience” is grossly problematic, because Buddhist monks are “deeply acculturated, radically socialized, and linguistified” adults, whose brains are trained to describe meditation in the traditional terms and cannot avoid superimposing conventional definitions on their own individual experiences.

In summary, Waldron concluded that there is no truly autonomous first-person experience—nor there is a truly autonomous third-person experience—but they are inescapably intersubjective, that is, they are already related in their origins. The next challenge for neuroscience, thus, would be to conceive of them as being together from the beginning and to revise its approach to spiritual experiences in the light of this new understanding.

Discussion

Following this presentation there was a lively discussion on the nature of human cognition and the verifiability of personal spiritual experiences. The main focus of the discussion was on the spiritual meditative practices of Buddhist monks.

Exoticization of Buddhist Meditators

Waldron discussed his dissatisfaction with the contemporary empirical research in neuroscience on the subjective spiritual experiences of Buddhist meditators and its subsequent uncritical interpretation as a true account of “what happens in reality during meditation.” He clarified why, in his opinion, contemporary neuropsychological research on spiritual experience conducted by the famous neurotheologian Andrew Newberg (outlined in his book *Why God Won't Go Away*) can be considered precarious and should be rigorously questioned and interrogated. Waldron highlighted two major underlying problems that he found with the above research: 1. an uncritical assumption in neuroscience that neurological processes are unproblematic; 2. an uncritical assumption that the meditators’ testimonies of “what happens during meditation” must be true and correct simply because they follow an ancient pedigree of Buddhist meditative practice. Waldron called this uncritical approach “a certain exoticization of Buddhist meditators.” He argued that all meditative practices must be approached as intrinsically contextual: throughout the history of evolution of Buddhist meditative practices there have been various schools as well as many individual instructors. All of them have given different accounts of what happens during meditation and constructed specific interpretative frameworks to account for their experiences. No phenomena, whether internal or external, can be understood independently from our conceptual frameworks, and contemporary practitioners of Buddhist meditation cannot give us “objective” interpretation of the influence of Buddhist meditation on human consciousness.

We Are “Linguistified Brains”

The theme of the precariousness of the scientific interpretation of experience was broadly developed on a theoretical level throughout the discussion. Waldron insisted that any research in cognitive science and neuroscience of spirituality must constantly take into account the fact that human subjects are “linguistified brains,” trapped into particular culturally-biased sociolinguistic codes and trained to express their “realities” through certain conventional patterns. There are no purely subjective or purely objective modes of mediation, which is why personal experiential accounts and interpretations should never go unquestioned or treated as sufficient tools for scientific endeavor. A widely accepted interpretative dichotomy of a “first-person account” vs. “third-person

account” of reality as completely separate modes of understanding is deeply questionable: this distinction must be treated as purely conventional because all interpretations are embedded into a socio-cultural matrix of meaning constructed through the causal interaction of its components. This is particularly relevant to the discussion on the nature of human consciousness because we must be constantly aware that the study of human consciousness is mediated through our modes of understanding, to which causal interaction is central. The world as we experience it (the arising of the world) is the world in which we are engaged because of the cognitive schemas that we have and whatever we talk about is already inscribed within our cognitive apparatus.

The Problem of Linguistic Idealism

Keel noted that the above critique might fall under the category of “linguistic idealism” and advised that, in dealing with the mind-body problem, it may be crucially important to maintain a healthy balance between radical objectivism, previously criticized by Waldron, and radical linguistic determinism, which claims that there is nothing out there in reality and all existence is a product of our imagination.

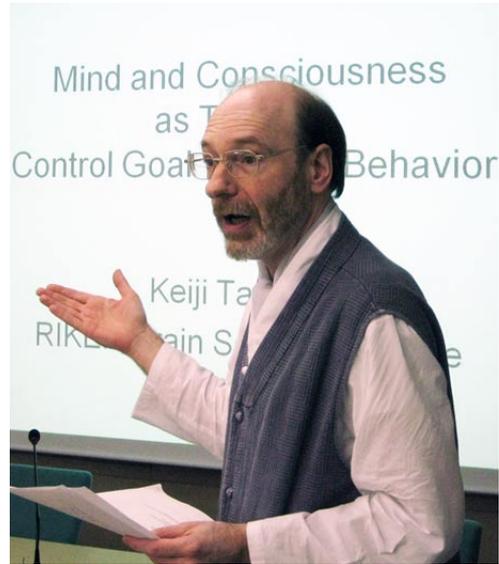
Keel’s comments sparked multiple questions regarding the Buddhist interpretation of cognition: Do Buddhist practitioners themselves make a distinction between the internal and the external? Where does “*rupa*” (color/form) belong in the Buddhist interpretation of reality? How does Buddha see reality? What is Nirvana from the point of view of reality?

Waldron suggested that, according to traditional Buddhist doctrine, only the Buddha sees things as they really are, while all other humans see things colored by their cognitive schemas. Nirvana is a state of being free from the present world of “independent subjects suffering from independent objects”; in this sense Nirvana is beyond the subject-object duality. He also clarified that within the Buddhist tradition, “*rupa*” is an experiential property; it is the experience of form, not a fixed entity. The focus of Buddhist investigation is not on the ontology of the external world and its objects but on our epistemological understanding of it.

Yogācāra and Cognitive Science

During the final part of the discussion, the participants focused again on the connection between the ancient Indian Buddhist school of Yogācāra and contemporary cognitive science. It became evident that both Yogācāra and contemporary cognitive science elaborate on the assumption that we perceive reality a certain way because we are neurologically trained to do so through linguistification and culturization of our brains. Waldron explained that Yogācāra does not deny the existence of external reality per se, “It is the reification of those

objects as something separate from our cognitive apparatus that Yogācārins are critiquing.” This is where cognitive science resonates with Yogācāra: it also claims that our systems of perception are not ontogenetic but philogenetic (evolutionary) and in the course of evolution our neurons have developed as radically conditioned by sociality, language, and culture. We are trained to see certain lights and shades, forms and shapes, and to construct them into “objective realities.”



Seeing the World “As it is”

In conclusion, Waldron suggested that the dialogue between religion and science needs to employ as pragmatic tools of investigation those conceptual models that explicitly avoid mind-body dualism. Finally, he proposed that in terms of the dialogue between science and religion it would be useful to make a thought experiment (at least on the conceptual level) that would conceive of what it might be like to live in a world unmediated, which would be a truly challenging project for cognitive science or neuroscience, as it always talks about construction of objects and how we never see the world directly but always in a mediated fashion.

Session 3. Brain Science and *Kokoro*

First speaker: Iriki Atsushi, *RIKEN Brain Science Institute, Japan*

Topic: “Intentional Niche-Construction: Neurobiological Bases of a Novel “Inclusive” Human Evolution”

The final session, which was chaired by Bernard Senecal from Sogang University, started with the lecture by Iriki Atsushi from RIKEN Brain Science Institute in Japan. The main thesis of Iriki’s presentation was that neuroscientific research in tool-use training of primates may provide significant insights into the evolutionary origins of human intelligence. In particular, this research claims to clarify how a coherent personal sense of self, or subjectivity, emerged in our ancestors in the process of tooling and manipulating objects. From the point of view of revelatory, metaphysically-framed religions, a troubling implication of

this research would be that not only human subjectivity—as an ability to differentiate between self and external objects—but also human spirituality—as an epitome of the highest abstraction—is a mere by-product of socio-cultural and neurobiological evolution. In other words—reading between the lines of Iriki’s presentation—human intelligence and human spirituality are fundamentally natural phenomena, and metaphysical speculations about transcendental revelations are no more than highly developed abstractions or phantoms in the brain. This is the major challenge that neuroscience sets for religion today.

While framing his speech in this challenging and provocative manner, Iriki also managed to present the most inclusive and balanced neuroscientific interpretations of human consciousness, simultaneously revealing his loyalty to an empirical paradigm of cognition as well as openness towards more “holistic, harmonized, and integrated” approaches in brain science. He emphasized the importance of “inclusive science” and “inclusive evolution” and demonstrated their advantages for the present dialogue.

Inclusive Science

In the first part of his talk, Iriki advocated the Japanese approach to brain science that “encompasses theory, practice, and implementation in medicine, psychology, engineering, the traditional humanities, and many other spheres of human endeavor.” He argued that in contrast to the more narrow and technically specified Western term “neuroscience,” the Japanese term “brain science” is far more inclusive and obviously more suitable for the contemporary dialogue between science and religion because, “Neuroscience, as it is commonly understood, is limited to the study of the brain as a biological organ. [On the contrary], brain science seeks an integrated, consilient view of the brain, mind, body, society, environment, and technology.” This “ambitious synthetic scientific agenda” of Japanese neuroscience as well as the more inclusive Japanese notion of “brain science” has become “widely embraced by the global community.”

Evolutionary Neuroscience

The main agenda of Iriki’s presentation was the demonstration of experiential evidence of tool-use training of non-human primates. Iriki explained how researchers at the RIKEN Brain Science Institute in Japan trained monkeys to use tools, which is an advanced cognitive function that monkeys do not exhibit in the wild, and then examined their brains for signs of modification. Following tool-use training, researchers observed neurophysiological, molecular genetic, and morphological changes within the monkey’s brains that enables them to incorporate tools into their own body schema. Despite being “artificially” induced, these novel behaviors and neural connectivity patterns reveal overlap with those of humans. Iriki explained that these discoveries may provide us with

a novel experimental platform for studying the mechanisms of human intelligence and for revealing the evolutionary path that created these mechanisms from the “raw material” of the non-human primate brain. It can also deepen our understanding of not uniquely human cognitive abilities. On this basis, researchers at RIKEN Brain Science Institute propose a theory of “intentional niche construction” as an extension of natural selection in order to reveal the evolutionary mechanisms that forged the uniquely intelligent human brain, by which functions our cultures are formed.

Iriki made clear that the main goal of the above research is to provide the evolutionary basis for the genesis of human consciousness. By tracing the link between the ability of monkeys to incorporate tools into their body schema with the formation of body image in their minds, neuroscientists intend to theorize the evolution of human intelligence in terms of gradual progression: from the emergence of meta-subjectivity to symbolic thinking, from symbolic thinking to language, and finally from language to an ability for higher metaphysical abstractization.

Inclusive Evolution

Finally, Iriki introduced a unique theory of “group selection” (also referred to as “social evolution”), originally developed by Japanese biologist Imanishi Kinji about sixty years ago—a unique evolutionary theory which stated that evolution is induced not solely by competition, as the Darwinian theory had originally posited, but also by cooperation among organisms. The neurobiological framework that Iriki proposed above supports Imanishi’s idea that each organism acts “somewhat intentionally” in response to its environment, or niche. This notion of “sociality” among species or the idea that mutual social support is crucial for individual survival is what makes the theory of evolution more inclusive and more appropriate for the science-and-religion dialogue.

Discussion:

Who Tool-Trained Our Ancestors?

Following the speech by Iriki, a discussion revolved around the questions of the origin of human consciousness and the role of social interaction in brain evolution. Kim opened the discussion by querying what agency there was to have originally provided training and tooling to our ancestors within the course of historical evolution—assuming, of course, that brain evolution indeed requires tooling and training. Iriki clarified that, according to his hypothesis of “spontaneous emergence,” mutual training and stimulation among species is a natural process, so evolutionary alterations spontaneously arise from within the natural

environment. Thus, we can say that social interaction among a species is what serves as an agency in brain evolution.

The above hypothesis of “spontaneous emergence” was further developed by Waldron, who pointed out the conceptual link between the above hypothesis and the theory of “joint attention” in cognitive science that refers to an ability of multiple subjects to focus (and the intention to focus) collectively on a single object. This kind of “joint attention” brings awareness of multiple subjects into syncretism; perhaps human language emerged building upon that cognitive development of joint awareness and has become a sophisticated means of internalizing a notion of an individual self. An internal sense of self, thus, is really but a function of sociality and symbolic representation, as in the above “spontaneous emergence” hypothesis.

The participants, however, kept questioning the above hypothesis, inquiring whether training or tooling is a necessary prerequisite for brain evolution. Without any tooling or training, could conceptual perception develop in apes or prehistoric humans? Is a third-person acquisition possible without any education? Is conceptual perception possible at all in an uneducated mind? Is it language that presets cognitive patterns of perception?

Unitive Consciousness:

Natural Phenomenon or a Higher Esoteric Transrational Plane?

In an attempt to bring spirituality into a dialogue with cognitive science, Huh suggested that the notion of “social interaction among species” may be parallel with an esoteric anthropological concept of “unitive consciousness.” That is to say, ancient people had a sense of unity with the earth, of which modern people are not conscious; but this sense of unity can still be partially observed in human development: for example, when a mother cries, a baby cries. How can this spiritually-meaningful notion of unitive consciousness be applied to the discussion of brain evolution in neuroscience?

Iriki’s response reflected his predisposition towards a materialist worldview: unitive consciousness can be scientifically explained as a natural phenomenon, he argued, as long as it implies that individual consciousness is an element of the environment: environmental causes trigger certain reactions in the brain and one realizes that he is not in control of oneself—one is a part of nature. Probably this is how most non-human primates live without a “mind.” However, Keel insisted that the most important question remains as to whether that unitive consciousness can be considered a primal natural basis for the genesis of human consciousness, or whether it denotes an ultimate spiritual experience referred to by mystics and the esoteric—a higher transpersonal, transrational stage of unitary consciousness.

In response, Iriki suggested that humans are born into a social community and probably have this unitary consciousness on a fundamental level, but after acquiring language and other kinds of training, this sense of being a part of the whole disappears, resulting in the development of a clear sense of self. Iriki proposed that the significance of Buddhist spirituality and of various Buddhist meditative techniques lies in their ability to help humans get rid of that individualistic sense of self and recover the sense of unity with the universe. But once achieved through Buddhist meditation, what would the neural correlate of this unitive consciousness be? What would be the biological basis for it? These would be the questions for neuroscience to explore, according to Iriki.

The Role of Tool-Use Training in Human Evolution: Questions Remain

The participants further questioned the above-presented hypothesis of the emergence of human intelligence through tool-use training from the perspective of DNA determinism. Evidently, there is a difference in DNA between homo sapiens and primates. Iriki, on the contrary, argued that in addition to DNA, many epigenetic factors have played a significant role in human evolution. Moreover, some recent studies reveal that some sort of training may induce alterations in the transcriptions of DNA or RNA: in fact, environmental changes and human technological inventions also have the potential to alter DNA—not merely their sequences but their transcriptions, as well as other epigenetic processes. In short, DNA can be altered due to the changes in social environment, not merely biological environment.

Neuroscientific propositions by Iriki were challenged throughout the discussion from a variety of spiritual and theological angles: Is there a teleological factor in evolution? Does a watchmaker argument apply to brain evolution? What are the authentically cultural origins of human evolution? On a more pragmatic note, Does the evolutionary approach to human intelligence, advocated by neuroscience, imply that transhumanism is tenable? Does it insinuate that transhumanism is the next stage of human evolution?

Finally, even the way the present discussion was developing was questioned: Is it legitimate to bring metaphysical theological conceptions elaborated within the ‘civilized religions’ into a dialogue with neuroscience? Maybe neuroscience should deal only with what we call a religion in a “primitive form,” which remains on the basic level of symbolic thinking?

Overall, this very intense and provocative discussion helped bring into light various tensions and controversies boiling under the surface in the science and religion dialogue and allowed us to constructively reformulate some troubling questions for further analysis.

Second Speaker: Tanaka Keiji, *RIKEN*

Topic: “Mind and Consciousness as Tools to Control Goal-directed Behaviors”

The last lecture of the workshop was delivered by Tanaka Keiji, who also represented *RIKEN* Brain Science Institute in Japan. In his speech, Tanaka introduced his neuroscientific interpretation of “consciousness” or “what it means to have a conscious mind” by discussing neurobiological mechanisms of goal-directed behavior in the brain.

In introducing his research, Tanaka mainly focused on those experiments that revealed the dubiousness of human ability in conscious preference, discretion, and self-control, and argued that our perception of ourselves as coherent intentional subjects is often illusionary. Relevant to the present science and religion dialogue, the main argument of Tanaka’s presentation was that we should be very cautious in interpreting spiritual experiences—particularly first-person experiences—from the “conscious subject” perspective: our experience of ourselves and reality is significantly limited by the neurobiological makeup of our brains. Too much of what we perceive as our conscious choice is a mere delusion: most brain activities that evoke explicit actions occur unconsciously and the mind does not know the actual cause that evokes an action.

The “Choice Delusion”

To illustrate his ideas, Tanaka presented two sets of examples of neuroscientific experiments. The first experiments concerned the delimitations of conscious preferences. For example, an anti-correlated random-dot stereogram, in which white dots in the left-eye image correspond to black dots in the right-eye image evokes a vergence eye movement, while human subjects never see a figure, or continuous surface, there. In the other case, when experimental subjects were asked to select a preferred face from two faces shown side by side, they first directed their eye gaze evenly to the two faces but gradually tended to spend more time on one face. Finally, they selected the face which they spent more time observing. In an experimentally controlled condition in which one of two faces was presented for a longer period, the subjects again tended to select those faces on which they spent more time. While in reality the selection was determined by the actual length of time which experimental subjects spent observing faces, the subjects tended to think that their choices were determined by their conscious preference. The basic conclusion of the above experiments was that while we can be consciously aware of our intentional actions, (or goal-oriented behavior), our reflexes, stereotyped instinct behavior, or habitual behavior are not coherently revealed in the “conscious mind” and often remain beyond the scope of our awareness.

The other sets of experiments also supported the hypothesis that our seemingly conscious intentions and actions are really caused by external stimuli that go unnoticed by our minds. Tanaka introduced experiments that involved brain patients whose corpus callosum has been surgically cut for clinical purposes. In the brain of such patients, the left cerebral hemisphere does not have access to information processing in the right cerebral hemisphere. Because of the structure of the visual system, the stimulus images presented to the right visual field enter only the left hemisphere, whereas those presented to the left visual field enter only the right hemisphere. When the word “laugh” was presented to the left visual field of the patient, he/she laughed. However, when asked why they laughed, patients replied that it was funny that the experimenters conducted a boring test. In this case, the visual word entered the right hemisphere and evoked the action of laughing, but this procedure was not monitored by the language system localized in the left hemisphere. The language system instead created a reason that explained the action in the circumstances. The conclusion was that the human brain clearly has an ability to interpret its actions as intentional despite the fact that they were evoked by other unrelated mechanisms.

Emergence of the Conscious Mind

Finally, Tanaka moved to his hypothesis of the genesis of human consciousness, where “consciousness” is understood as a synthesis between a working memory that preserves information relevant to intention for later execution, and a language system that maintains intention in the long-term memory more easily.

According to Tanaka’s explanations, working memory requires top-down attention to select a particular piece of information relevant to the goal from constantly occurring sensory inputs and ideas, and to protect it by inhibiting these irrelevant disturbing inputs. Although many of the sensory inputs evoke actions and get into both the short- and long-term memories, only those that enter the working memory system are monitored by the mind. Similarly, out of many actions that are evoked by sensory inputs, preceding actions or emotions, only those ones that enter the working memory system come to the mind. Prefrontal cortex is essential for



the working memory and if for some reason it is damaged, patients (or animals with bilateral lesion in the prefrontal cortex) cannot perform tasks that require working memory and lose consistency in behavior. They often show imitation behavior, imitating actions of others, or forced tool use—that is, stereotyped action utilizing the tool placed in front of them. Patients reflectively do so even if they consciously try not to—these reflective actions are triggered by current sensory inputs and cannot be inhibited because of the damage in the prefrontal cortex. Evidently, such patients cannot consciously direct their behavior towards the goal they have in mind. The conclusion is that only those neural activities that enter working memory under the control of top-down attention become a part of the conscious mind, which implies that the “conscious mind” emerges from brain activities for the sake of controlling goal-directed behavior.

Discussion

The talk by Tanaka sparked multiple queries related to neuroscientific research in cognitive mechanisms of unconscious perception, evaluation, and preference. A particular interest was expressed in the ways in which neuroscientific analysis of unconscious cognitive mechanisms of preference can inform a Buddhist understanding of the unconscious formation of habit patterns and other non-volitional behavioral reactions. In the process of discussion, it became evident that a contribution of Buddhist psychology into neuroscience and cognitive psychology may significantly elucidate research of the unconscious.

Tanaka was also asked to clarify some practical neuro-physiological and medical questions regarding split-brain patients and their ability to process and convey information.

General Discussion

Is Spirituality Neurobiologically Determined?

Inspired by the preceding lecture by Tanaka, the general discussion tackled the problem of neurobiological determinism in the interpretation of spirituality. The participants raised many philosophical as well as technical scientific questions: Can the prefrontal cortex in the brain be considered “a seat of free will”? Maybe it is more correct to associate the emergence of free will with the top-down causality/intentionality in the brain (as directed from pre-frontal cortex to sensory cortex)? Do humans truly possess an authentically independent free will or is it a mere illusion? What is the relationship between goal-oriented behavior, mind, consciousness, and soul? Why would a neuroscience professor such as Tanaka mention the term “soul” in his scientific presentation, and what are the implica-

tions of that? What do neuroscientists mean by “soul”? Does it refer to a human sense of totality of existence that goes beyond a strictly scientific understanding of cognitive perception, or does it refer to a soul in the transcendentalist sense? How do we define the term “consciousness”? Does the definition of consciousness stretch further than “the equivalent of top-down attention” as proposed by Tanaka? Is consciousness present in humans when concentration of mind (goal-oriented behavior; intentionality) is not actively at work?

Tanaka clarified that in neuroscience the emergence of free will is most commonly associated with the prefrontal cortex in the brain and that consciousness is considered to be ontologically equal to top-down attention. Even in the state of split concentration (when performing multiple tasks), a person is fully conscious and self-aware of his actions. These states of concentrated attention may be considered the most correct interpretation of “consciousness.”

Another set of questions concerned a neuroscientific analysis of the historical evolution of consciousness. Inquiries arose as to how a prefrontal cortex had originally developed in primates. If indeed a prefrontal cortex developed in the brain as an evolutionarily tool allowing primates to create long-term action plans for survival, then how were primates aware of the advantage of such long-term action plans for their survival? More specifically, where did the survival instinct originally come from?

A number of intriguing questions challenging neuroscientific interpretations of transcendental spirituality were raised. Kim challenged the participants representing neuroscience to explain the phenomenon of “the third eye,” referring to an esoteric notion of the human ability for paranormal perception. The human brain, he argued, has the potential to trace the function of internal organs inside a human body; however, this information is normally unavailable to a person in a conscious state of mind; only through specific meditative techniques and yoga practices can such an insight into the function of internal bodily organs be gained. What is even more fascinating, however, is that individuals possessing this kind of supernatural perception may have an insight not only into their own internal organs but also into the internal organs of other people.

Tanaka responded that the human brain does not directly convey information about the functions of internal organs to human consciousness because it is “not designed this way.” That is to say, the purpose of the brain is to control bodily actions, not to philosophically reflect on physiological functions of internal organs. However, Tanaka admitted that internal organs have their own sensory systems and perhaps one can eventually develop this kind of extended sensory perception through concentrated training. He insisted, however, that there is presently no valid scientific evidence in support of these phenomena.

A new set of questions emerged linking Tanaka’s research in goal-oriented behavior and top-down attention to a Buddhist analysis of consciousness. The

participants questioned whether it is legitimate to associate consciousness exclusively with concentrated states of top-down attention. How often can the human mind be in a concentrated state of top-down attention? To draw a connection with Nirvanic states of awakening in Buddhism, even the Buddha himself allegedly was not always in a state of top-down attention. Moreover, Buddhism describes pure states of consciousness that are selfless. So, what are these pure states of selfless consciousness and how can they be interpreted from the perspective of brain science?

The discussion also concerned the problem of neuroscientific interpretations of conscious awareness in brain-dead patients. Senecal brought up the examples of the ability of brain-dead patients to consciously make willful decisions to postpone one's physical death or to purposefully surrender to it. He described some particularly mysterious cases when brain-dead individuals appeared to make conscious choices to postpone their bodily death until the arrival of relatives or when they decided to "let go" in response to a relative's verbalized permission. "How can brain science relate to such human experiences?" "How can brain-dead patients manifest intentional behavior?" Various troubling questions surrounding brain-dead patients and individuals in comatose states were discussed and the conclusion was made that, considering the truly mysterious nature of these experiences, we still have difficulty in moving beyond the materialistic paradigm and achieving a full integration of brain science with the religious understanding of the human continuum.

Mysticism: A Playground of Illusions

The rest of the discussion concerned the legitimacy of the subjective interpretation of internal spiritual experiences, such as a sense of God's presence, revelations by the Holy Spirit, and other commonly reported revelatory phenomena and supernatural perceptions. "How can brain science explain the phenomenon of the Holy Spirit?" "Is a sense of God's presence a mere illusion?" "Is it a psychopathological abnormality?" "Neurologically, is there a fundamental difference between having an authentic mystical experience and having a pathological dysfunction in the brain?"

Tanaka—a self-professed Christian—cautioned the participants once again to be aware of the fact that people's internal subjective experiences (such as an experience of the Holy Spirit) are not very reliable from the perspective of the scientific analysis of cognition. The scientific fact remains that brain activity in the primary sensory cortex does not necessarily come directly to the mind but goes to an associated area in the brain, interacts with the prefrontal cortex, and we become aware of this information only in retrospect from memory. As a Christian neuroscientist, Tanaka did not deny the reality of authentic spiritual experiences but he expressed a concern that scientifically distinguishing

externally-triggered experience from one's internal thinking or imagination is truly problematic. In the case of schizophrenia patients, for example, those brain activities are very confused. Tanaka suggested that only under some sort of ideal circumstances in which one's mind can be cleared from internal self-centered fixation can one potentially hear the voice of God.

In order to further explore the problems of the neurobiological determinism of spiritual experience, Huh brought up the topic of Persinger's "God machine," and the participants discussed this recent neurotheological research that claims to have discovered particular areas in the brain responsible for the production of transcendental experiences. What are the implications of these experiments? Does it mean that different areas in the brain are responsible for/tuned for different religions? Maybe there is a Buddhist-related area in the brain, a Christian-related area, an Islam-related area, and so on? Are there objective criteria measuring the impact of supernatural perceptions on individuals and community? What are they? These and many other questions were left for further exploration. The basic conclusion here was that if we are to proceed with the dialogue between science and spirituality we should be very cautious as to how we scientifically approach and interpret spiritual experiences. As Senecal put it, "mysticism is a playground of illusions," and to collect scientifically valid evidence on the basis of one's inner personal impressions seems almost entirely unrealistic—indeed, science requires some empirically verifiable data.

Interpretation of Experience from the Perspective of Buddhist Nominalism

Regarding the subject of inner impressions and their subjective interpretations, Waldron proposed to analyze this problem from the Buddhist perspective. He argued that spiritual experience—insomuch as any other human experience—is subject to interpretation, where interpretation is embedded into one's already-existent conceptual system (belief-system). That is to say, all experiences are interpreted by people relative to their expectations and understanding of the world prior to those experiences. As we know from the philosophy of science, data is interpreted in relation to larger theories; interpretative frameworks are chosen to fit one's habitual modes of understanding. Buddhist philosophy would say here that our experience is mediated through our interpretative frames up until the point where Buddha can see something "as it is." But prior to that moment of enlightenment human beings experience things in terms of frameworks that make sense to them. For example, there is no *a priori* reality to a neurological explanation of the Holy Spirit, but there is an experiential dimension in which we relate to one kind of explanation. In this respect, there is no point in trying to find out whether we really experience phenomena like the Holy Spirit—in fact, the notion of finding out what is really going on the spiritual plane is something we should be suspicious of—it is our experience of it that matters.

Senecal's contra argument was that while it is true that we construct our interpretative frames using habitual concepts and patterns, it does not exclude the potential for the emergence of radically new ideas and discoveries: we can see multiple historical examples of unprecedented theories and philosophies arising in drastic contrast to the old habitual mind-frames, such as Buddhist philosophy or quantum theory. Again, it became evident throughout the discussion that there is no one-sided solution to the problem of the interpretation of spiritual experience.

Teleological Determinism?

Iriki articulated a hypothesis that human spirituality can be understood in terms of primordial innocence and it was after the historical emergence of language and top-down intentionality in the left brain that humans ceased to "hear God's voice"—that is, they lost their primordial ability to connect with the world intuitively. He suggested that due to the emergence of language and top-down intentionality in the brain, humans lost their ability to respond automatically to environmental demands by mirror neurons. Iriki also argued that the human mind has an instinctive drive to explain things in causal terms but that these causal relationships between things and events may very well be a mere illusion in the brain. In the real world there may be no causal correlations at all, but our brain wants to explain things in causal terms—this is what lies behind our ability to form interpretative frameworks. This ability for teleological reasoning may be just a basic neurological function and, therefore, the concept of "God" might also be a mere construct of human neuro-evolution.

The discussants further entertained this idea: perhaps our brains are installed with hyperactive agency detective devices and in our search for agency we will surely see faces in the clouds—simply because this is how we are neurologically designed. The consensus was, however, that this psychological projection hypothesis is just another reductive theory—again we are trapped between materialistic reductionism and metaphysical supernaturalism.

The Future of the Dialogue

In the end, the participants tried to envision the future of the dialogue between science and religion and the particular contribution that brain science will make in this endeavor. While many questions remained unanswered, the present workshop helped reveal numerous contradictions between scientific and religious perspectives on the nature of human consciousness, and highlighted interpretative and epistemological differences between materialistic vs. metaphysical approaches to spirituality.

From the perspective of the dialogue between science and religion, the present workshop was a significant step forward beyond the previous workshop in

Taiwan. While at the previous workshop in Taiwan the focus was on neuroscientific and broader scientific perspectives on consciousness, the level of significant input from the viewpoint of religion was low. At the Korea workshop, however, both neuroscientific and religious perspectives on consciousness and spirituality were represented in equal degree and this made the discussions provocative and illuminating. Throughout the workshop, many stumbling blocks hindering the progress of the science-and-religion dialogue were unveiled and many original constructive solutions were offered. In the end, the participants expressed hope that this dialogue will blossom in the future and that the scientific and religious worlds will constructively complete and balance each other. As Senecal suggested in conclusion, “If scientists say too much, science becomes another religion, if religious people say too much they become irrational—that is why we need a mutually transforming dialogue. And this kind of talk must continue.”