

**Warren S. Brown, Fuller Integration Lectures**

**Lecture 2: “The Knotty Implications of Recent Neuroscience Research”**

February 17, 2005

**I. Retrospect and Prospect**

These lectures are about the nature of humankind. We are considering how to reconcile neuropsychological and theological accounts of human nature.

In my first lecture I attempted to create some elbowroom for myself by suggesting that body/soul dualism is not necessary to a Christian and Biblical theology. In the second part of yesterday’s lecture I described what I believe to be the consequences of the strong tendencies toward innerness and Gnosticism that come with body/soul dualism.

In today’s lecture, I wish to start from the beginning. I will attempt to restate the problem in an unambiguous way, survey the current neuropsychological data that are making the issue particularly acute for 21<sup>st</sup> Century Christians, and suggest a method for going about resolution of these questions. In the last part of this lecture, I will describe some adjustments we might want to make in our theological anthropology in order to establish greater resonance between theology and neuroscience.

Tomorrow, I will focus on adjustments that need to be made in the conclusions offered by neuroscience and neuropsychology. Specifically, I will attempt to show that neither reductionism nor neurobiological determinism are necessary outcomes of a physicalist understanding of human nature.

## II. The Problem of Human Nature

The issues involved in considering the relationship between theological and neuroscientific views of human nature can be expressed as a conflict between 2 to opposing propositions:<sup>1</sup>

Proposition 1: *Humans are neurobiological beings whose mind (also soul, religious experience) can, in theory, be exhaustively explained by neurochemistry and ultimately by physics.*

This proposition is called eliminative materialism (or reductive physicalism). In essence, this position claims that all the causal forces in human thought and behavior can be reduced to the outcome of the operation of the laws of physics. This view is characteristic of the view of many (but certainly not all) scientists and philosophers. It is problematic in that all rationality, meaning, and ethics disappear (i.e., become incoherent) when everything about the future is physically determined at the atomic or subatomic levels. Of course, this extreme view of physicalism is unacceptable to Christians.

Neuroscientist and Christian writer Donald MacKay has criticized this proposition as "nothing buttery", that is, human nature is reduced to be "nothing but" the operation of subatomic forces. MacKay writes:

According to this view, only where physical explanation was impossible could any other account be taken seriously in its own right. Otherwise, the whole thing could be explained away as 'nothing but' the mindless motion of molecules."<sup>2</sup>

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<sup>1</sup> These propositions are taken from: Brown, W.S. (2002) Nonreductive physicalism and soul: Finding resonance between theology and neuroscience. American Behavioral Scientist. 45: 1812-1821.

The second, opposing proposition can be stated as follows:

Proposition 2: *Humans are physical beings who also have non-material souls. It is the soul that is “spiritual” and that allows us to experience and relate to God.*

This proposition represents classic body/soul dualism. As I briefly described in the first lecture, we get this view primarily from the teachings of Plato, St. Augustine, and Descartes. As I also argued in Lecture 1, this view pervades the modern Christian view of the person and is problematic in fostering Gnosticism.

The primary points of tension and conflict between these two polar positions can be made particularly salient by the following questions:

- If spiritual / religious experiences and moral agency are a manifestation of our souls, how can one account for the impact of brain disorder on these capacities and experiences?
- But if humans are nothing-but biology, where is human value and dignity to be found? Are we biological automata or free moral agents?

It is clear that something is wrong in one or both of these propositions. My thesis is that neither proposition can stand up to scrutiny and, thus, both propositions can be rejected. Some alternative view of human nature needs to be considered.

### **III. The Knotty Data**

What makes the tension between these conflicting propositions particularly critical for Christians at this point in history is the very rapid expansion of methodology and kinds of problems being investigated in modern neuroscience research. Functional

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<sup>2</sup> Donald M. MacKay. *Human Science and Human Dignity*. (Downers Grove, Ill.: Interscience Press, 1979), p. 27.

Magnetic Resonance Imaging (fMRI) is allowing scientists to study the brain activity associated with the highest levels of human psychological and cognitive processing, including the study of interpersonal relatedness and religious experiences.

Neuroscience is no longer confining its attention to research on basic cognitive functions such as perception, action, memory, learning, problem-solving, etc., but is now studying such topics as empathy, social exclusion, fairness, regret, moral decision-making, and religious experiences.

### Neuropsychological Studies of Humanness:

The following is an unsystematic sampling of examples of recent research on brain function and the sort of capacities that seem particularly important to our humanness. These examples will help us get a clearer picture of at least some of the most relevant neuroscience research. I will describe studies relating to the following 8 domains of human cognitive and psychological function: language processing, attention and intention, a Theory of Mind (“mentalizing”), the experience of unfairness, regret, empathy, social exclusion, and political preferences.

Language Processing: Language is a critical and relatively unique aspect of human cognition. Dehaene-Lambertz, et al.<sup>3</sup> reported an fMRI study of very young, 3-month-old, pre-linguistic infants listening to speech sounds. It is clear from the fMRI images that they present that the language areas of the left hemisphere that are known to be specifically involved language processing in adults are also involved in analysis of speech sounds in 3-month-old infants. This study is merely one representative of a vast

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<sup>3</sup> Dehaene-Lambertz, et al. (2002) Functional neuroimaging of speech perception in infants. Science, 298, 2013-2015.

amount of work on the neuroscience of language processing. However, it serves to begin our survey of brain processing and higher human capacities.

Attention to Intention: Lau and colleagues<sup>4</sup> used fMRI to study the differences in brain functioning between attention to the intention to move, versus attention to the movement itself. They found areas in the left parietal lobe and right dorsolateral prefrontal cortex that became relatively more active when the participants focused attention on their own intentions. This is tantamount to the neural correlates of at least one form of self-reflective thought.

A Theory of Mind: Theory of Mind (or “mentalizing”) is the capacity to correctly discern the mental states to other individuals during social interactions – knowing what others think, know, or believe. Mentalizing includes the process of correctly attributing motives and intentions to other persons. Individuals with autism are thought to have a specific deficit in the ability to mentalize. Fulvia Castelli and her colleagues<sup>5</sup> at University College, London, published an fMRI study of individuals watching cartoons of 2 geometric shapes moving around on a computer screen. The movements of the shapes induce the viewer to mentalize, i.e., to attribute intentionality to the actions of the shapes. This task has proven useful in documenting the deficiencies in mentalizing in individuals with autism. In non-autistic adults, the attribution of motivations and intentions to the movements of these simple geometric shapes was associated with activation of the medial prefrontal cortex and the superior temporal sulcus.

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<sup>4</sup> Lau et al. (2004) Attention to intention. *Science*, 303, 1208-1210

<sup>5</sup> Castelli et al. (2002) Autism, Asperger’s syndrome and brain mechanisms for the attribution of mental states to animated shapes. *Brain*, 124, 1839-1849.

The Experience of Unfairness: A concept of fairness is an important and very high-level aspect of human interpersonal interactions. Sanfey and colleagues<sup>6</sup> have reported functional brain scanning while individuals participate in a game in which 2 persons split a sum of money. One player proposes a division of the money and the other person (whose brain is being scanned) can accept or reject the offer. The experience of being given what is perceived to be an unfair division of the money is accompanied by activation in the anterior cingulate gyrus, the insula, and the right dorsolateral prefrontal cortex.

Regret: Regret regarding one's past behavior is important in guiding future behavior and establishing moral constraints. It has been demonstrated that individuals with damage to the orbital frontal area of the brain lose the capacity to experience regret regarding the outcome of their behavior and choices.<sup>7</sup> We will encounter this phenomenon again when we consider the famous case of Phineas Gage (later in this lecture).

Empathy: A recent fMRI study showed that individuals who are feeling empathy for the pain currently being experienced by a significant other person manifest activation of some of the same brain areas that are activated when that person experiences the pain directly.<sup>8</sup> Specifically, empathy-related activation occurs within the insula and anterior cingulate gyrus that is involved in the affective experiences of pain, but no empathy-related activation was found in the somatosensory areas that were activated by actual

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<sup>6</sup> Sanfey et al. (2003) The neural basis of economic decision-making in the ultimatum game. *Science*, 300, 1755-1758.

<sup>7</sup> Camille et al. (2004). The involvement of the orbitofrontal cortex in the experience of regret. *Science*, 304, 1167-1170.

<sup>8</sup> Singer, et al., (2004) Empathy for pain involves the affective but not sensory components of pain. *Science*, 303, 1157-1162.

pain itself. Thus, empathy is an affective attunement that has clearly identifiable neurophysiological correlates.

Social Exclusion and Inclusion: Eisenberger and colleagues<sup>9</sup> have done functional scanning on individuals as they are being included in, or excluded from, a game being played in virtual reality while their brain is being scanned. fMRI images show that the experience of social exclusion is accompanied by activation in the anterior cingulate gyrus and the right ventral prefrontal cortex.

Political Preferences: I have not seen the actual paper, but the Pasadena Star News (a highly reliable source of information about science) reported (just prior to the November election) research done at UCLA regarding brain correlates of political preferences. The study reported fMRI differences between viewing pictures of Bush and Kerry that were particular to Democrats versus Republicans.<sup>10</sup>

The implications of these studies are being taken very seriously by many scientist as central to our understanding of human nature. In fact, the success of these research projects has fostered various suggestions about whole new fields of study, such as: Social Cognitive Neuroscience, Neuroeconomics, Neuromarketing, Neuroethics, and Neuropolitics. The point of this quick survey of examples of current research in neuroscience is to illustrate that the brain is involvement in all of the very high-level and relatively unique aspects of human cognitive and psychological functioning, and that these functions can be studied using recently developed methods

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<sup>9</sup> Eisenberger et al. (2003) Does rejection hurt? An fMRI study of social exclusion. *Science*, 302, 290-292.

<sup>10</sup> Research by Joshua Freedman and Marco Iacoboni as described in “Scientists are scanning our brains to learn how to sell a candidate”, Pasadena Star News, Oct. 29, 2004.

of brain imaging. And here is the crux of the matter ... *It is becoming increasingly difficult to find an area of human cognitive, affective, or social functioning that has not already been shown to have correlates in unique patterns of brain functioning.*

#### **IV. Neuropsychological Studies of Religiousness**

To the above list of new neuroscience fields being proposed could be added the serious proposal regarding a field of study called “Neurotheology”. This proposal is based on a number of recent studies of human religiousness, spirituality, and moral behavior. These studies raise even more serious problems regarding our understanding of human nature – particularly regarding the spiritual nature of humankind – creating even more intense dissonance with the predominant body/soul dualism of traditional Christian thinking.

The following are examples of the most problematic neuropsychological studies that focus on human religiousness and spirituality: genetics of self-transcendence, frontal lobe brain damage and moral behavior, brain activity during moral decision-making, brain activity during religious meditation, temporal lobe epilepsy and peak religious experiences, and Transcranial Magnetic Stimulation of the brain and religious experiences.

Genetics of self-transcendence: There is some interesting recent work suggesting the impact of our genetic endowment on our tendencies to be religious. Lindon Eaves (both a geneticist and a Episcopal priest) has done much of the interesting work in this area.<sup>11</sup> For example, Eaves presents evidence from studies of identical versus fraternal twins suggesting a genetic contribution to our tendency to have self-transcendent experiences.

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<sup>11</sup> This research is reviewed in: Lindon Eaves, “Genetic and social influences on religion and values” in Malcolm Jeeves, *From Cells to Souls – and Beyond: Changing Portraits of Human Nature* (Grand Rapids, MI: Eerdmans, 2004), pp. 102-122.

Thus, some aspects of our personal spiritual tendencies are influenced, at least some small degree, by our genetic endowment.

Frontal lobes and moral behavior: One of the most famous cases in the annals of neurology is that of Phineas Gage. This case illustrates diminished moral capacity from damage to the medial frontal lobes. As the story goes, Gage received major damage to the middle parts of the frontal lobes when an iron bar he was using to tamp an explosive charge was blown up through his eye-socket and out the top of his head. While Gage never lost consciousness, and seemed to have recovered physically within days, he was never the same person. Prior to the accident he was an intelligent person, capable and efficient worker, excellent manager, responsible family man, and upstanding citizen. While he maintained his general intelligence after the accident, damage to his medial frontal cortex resulted in him becoming unreliable and capricious, socially inappropriate, and amoral. He lost his job and his family. He remained unaware of his problem. Patients with this form of brain damage often have difficulty regulating their behavior in order to abide by norms of socially acceptable or moral behavior. Such individuals may violate social conventions, laws, ethical standards, or the rules of courtesy, civility, and regard for the benefit of others. Righteousness, at least as it might be expressed in behavior, is diminished, if not impossible, in many patients with damage to the medial frontal cortex.

Brain Activity during Moral decision-making: Recent fMRI studies by Greene and collaborators have looked at moral decision-making in normal individuals. First, the studied the enhancement of brain activity as moral decisions become more difficult. The brain areas that became more active as moral decision became more difficult included

the frontal lobes and cingulate gyrus.<sup>12</sup> A follow-up to this study involved contexts where the optimum decision involved imaging oneself to be directly inflicting harm on one other person in order to save the lives of many other persons. Functional brain imaging indicated that making this sort of decision was correlated with a wide network of brain activation, including not only the medial frontal cortex, but also the posterior cingulate gyrus and the posterior parietal lobe.<sup>13</sup>

Brain activity during religious meditation: Discussions of brain function and religious experiences typically make reference to the work of Newberg, d'Aquili, and their collaborators.<sup>14</sup> These investigators reported studies of regional cerebral blood flow in both Buddhist monks and Catholic nuns during meditation. The results indicated both increased bilateral frontal activation and decreased right parietal activity when these meditators reached a state where they reported achievement of the experience of "oneness". Decrease activity of the right parietal lobe was interpreted as a correlate of the absence of a sense of self experienced in such meditative states.

Temporal lobe epilepsy and peak religious experiences: There is a significant literature in neurology that suggests that in some cases of individuals with temporal lobe epileptic seizures, intense religious states are experienced as a part of the aura leading up to the seizure. In these persons experiences of religious awe, ecstasy, or ominous presence appear to be a product of their seizures.

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<sup>12</sup> Greene et al. (2004) The neural bases of cognitive conflict and control in moral judgment. *Neuron*. 44:389-400.

<sup>13</sup> Greene et al. (2001) An fMRI investigation of emotional engagement in moral judgment. *Science*, 293: 2105-2108.

<sup>14</sup> Newberg, A., Alavi, A., Baime, M., Pourdehnad, M., Santanna, J., and d'Aquili, E. (2001) The measurement of regional cerebral blood flow during the complex cognitive task of meditation: a preliminary SPECT study. *Psychiatry research*. 2, 113-22

Mark Salzman's recent novel, *Lying Awake*, tells of a nun with religious visions associated with temporal lobe seizures.<sup>15</sup> Dostoyevsky (who himself had a seizure disorder) gives a particularly graphic literary description of this sort of a seizure in the experiences of Prince Miskin in *The Idiot*. The following passage from Dostoyevsky illustrates nicely the form of religious experience that is sometimes associated with temporal lobe seizures:

“...he fell to thinking that in his attacks of epilepsy there was a pause just before the fit itself ... when it seemed his brain was on fire, and in an extraordinary surge all his vital forces would be intensified. The sense of life, the consciousness of self were multiplied tenfold in these moments. ... His mind and heart were flooded with extraordinary light; all torment, all doubt, all anxieties were relieved at once, resolved in a kind of lofty calm, full of serene, harmonious joy and hope, full of understanding and the knowledge of the ultimate cause of things. ... If in that second – that is, in the last lucid moment before the fit – he had time to say to himself clearly and consciously: ‘Yes, one might give one’s whole life for this moment!’ then that moment by itself would certainly be worth the whole of life.”<sup>16</sup>

A very similar report of the subjective experience associated with a temporal lobe seizure can be found in the modern neurological literature in an article by Naito and Matsui: Triple halos appeared around the sun. Suddenly the sunlight became intense. I experienced a revelation of God and of all creation glittering under the sun. The sun

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<sup>15</sup> Mark Salzman. *Lying Awake*. (New York: Alfred A. Knopf, 2000).

<sup>16</sup> Fyodor Dostoyevsky. *The Idiot: Translated by Henry and Olga Carlisle* (New York, Signet Classic, 1969).

became bigger and engulfed me. My mind, my whole being was pervaded by a feeling of delight.<sup>17</sup>

These clinical reports have led neuroscientist V.S. Ramachandran to speculate on the existence of a “God Module” in the brain., i.e., “dedicated neural machinery in the temporal lobes concerned with religion.”<sup>18</sup> Saver and Rubin<sup>19</sup> suggest a less outrageous idea – the “limbic marker hypothesis” of religious experiences. They hypothesize that the limbic system tags certain encounters as “crucially important, harmonious, and/or joyous, prompting comprehension of these experiences within a religious framework.” Whatever the best theory of the meaning of this phenomenon, it is clear that certain patterns of electrical activity involving the temporal lobes can cause intense and personally significant experiences that the person describes in religious terms.

Brain stimulation and religious experiences: Abnormal activity of the temporal lobes can be induced artificially in non-epileptic individuals using a non-invasive procedure called Transcranial Magnetic Stimulation. Michael Persinger<sup>20</sup> reports experiments where electromagnetic stimulation of the right temporal lobe resulted in the person reporting a “sense of presence.” This “sense of presence” is sometimes experienced by the person as the presence of God or angels or other supernatural persons. This has led Persinger

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<sup>17</sup> Naito, H. and Matsui, N. Temporal lobe epilepsy with ictal ecstatic state and interictal behavior of hypergraphia. *Journal of Nervous and Mental Disease*. 1988, 176(2):123-4.

<sup>18</sup> V. S. Ramachandran, et al., “The neural basis of religious experiences,” *1997 Society for Neuroscience Conference Abstracts*, p. 1316.

<sup>19</sup> Saver, J.L. and Rabin, J. (1997). The neural substrates of religious experience. *Journal of Neuropsychiatry*, 9, 498-510.

<sup>20</sup> See Persinger, M.A., Makarec, K. (1987). Temporal lobe epileptic signs and correlative behaviors displayed by normal populations. *Journal of General Psychology*. 114: 179-195; and Persinger, M.A., Makarec, K. (1993). Complex partial epileptic signs as a continuum from normals to epileptics: Normative data and clinical populations. *Journal of Clinical Psychology* 49: 33-45.

to suggest that all persons who have religious experiences are having microseizures of the right temporal lobe. A similar explanation is given by Persinger for other paranormal experiences, such as reports of encounters with aliens.

The implications of these studies of the neuroscience of religiousness are generally dissonant with our dominant Christian understanding of human nature that suggests that these experiences are manifestations of our souls and should not be affected by, or be the products of, our bodies or our brains. Brain function, brain damage, or brain stimulation can in various ways affect, or account for, “soulish” experiences and behaviors. This research raises many questions: Can religious orientation be entirely reduced to genetics? If brain damage affects our ability to act morally, when and how are we morally responsible agents? If religious experience can occur from abnormal brain activity, what should we believe about normal, everyday religious experiences?

With respect to our view of human nature, these neuroscience studies of our religiousness and spiritual experience raise the question, *If the brain does all of this, what does a soul do that the brain isn't doing?*

As I quoted in the last lecture, theologian Wolfart Pannenberg has asked, “When the life of the soul is conditioned in every detail by bodily organs and processes, how can it be detached from the body and survive it?”<sup>21</sup> Thus, the consequences of neurological damage and disease on the most human aspects of behavior, and on spiritual experiences and moral agency suggest abandoning dualism.

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<sup>21</sup> Wolfart Pannenberg, *Systematic Theology*, vol. 2 (Grand Rapids, Eerdmans, 1944), p. 182. As quoted by Joel Green, What does it mean to be human? In Malcolm A. Jeeves, *From Cells to Souls – and Beyond*. (Grand Rapids, Eerdmans, 2004), p. 180.

## V. The Resonance Model of Integration

As a neuropsychologist teaching at Fuller Theological Seminary, I live simultaneously in the thought-worlds of theology and neuroscience, and thus I am straddled between advocates of the opposing propositions I mentioned earlier. While this makes for a very stimulating and exciting academic existence, it also comes with an inherent tendency that is problematic.

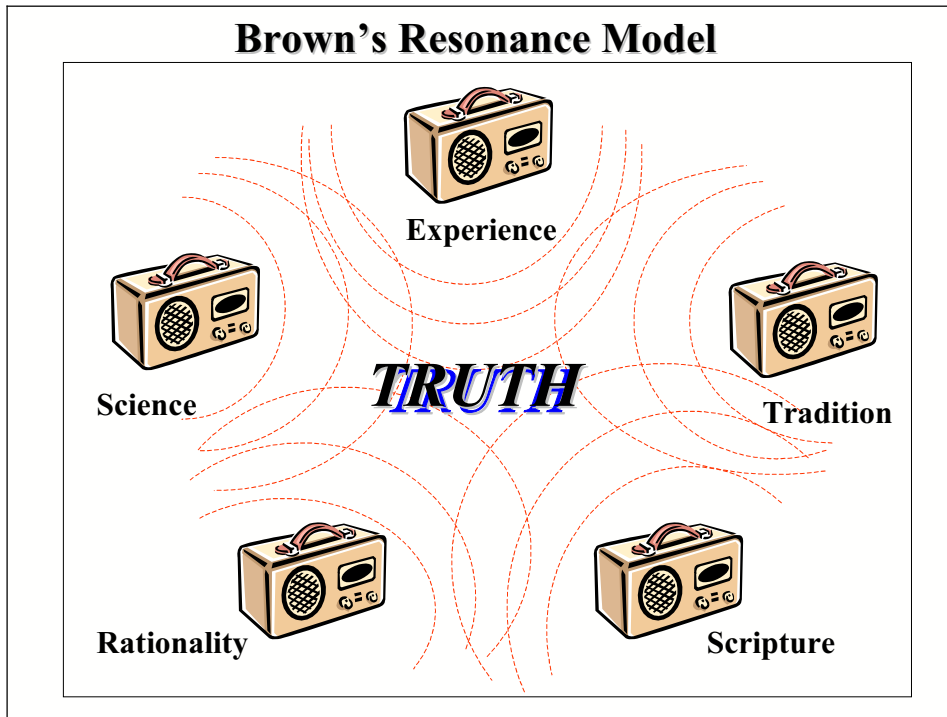
The problem is what my late friend and mentor, Donald MacKay, called “conceptual apartheid”<sup>22</sup> – that is, an implicit commitment to keeping these two views of human nature in watertight compartments so that they can never interact. The thoughts and ideas I am presenting in these lectures represent my efforts to resolve my own “conceptual apartheid.” Fortunately, it is rather popular these days to think about the relationship between religion and science. “Conceptual apartheid” is being confronted in many.

However, it is my opinion that we are still struggling for an understanding of how to go about this integrative work and what exactly is the hoped-for end product. As I have attempted to clarify, in my own mind, the nature of the religion-science problem, and how to proceed in thinking specifically about theology and neuropsychology, I have developed what I call the Resonance Model. My model is graphically illustrated in the following figure.<sup>23</sup>

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<sup>22</sup> MacKay, op. cit., p. 29.

<sup>23</sup> Figure taken from Warren S. Brown, “Resonance: A Model for Relating Science, Psychology, and Faith,” *Journal of Psychology and Christianity* 23 (2004): p. 113. Reproduced with the permission of the publisher.



This model is a dynamic metaphor based on the acoustic properties of the interactions of different sounds. In this model I have suggested that there are 5 authoritative sources of information about human nature that are illustrated as 5 little radios. Each radio (or information source) is giving off an auditory signal (i.e., information from that domain with implications for our understanding of the nature of humankind). The signals are directed toward the middle, indicated by the radiating semi-circles.

In the middle of the 5 sound sources, where the sound waves meet and overlap, is where we locate ourselves, and where we experience either resonance between the sources, or dissonance. In the middle you can see the word "truth". This word is meant to be graphically represented in a fuzzy and indistinct manner to indicate our partial and incomplete understanding of the truths of the nature of humankind at any particular time.

Each radio is labeled regarding the source of the information:

Upper Left – “Science”: This means the theories and data taken from systematic observations of the physical, biological, and social world.

Lower Left – “Rationality”: Here I mean pointers to Truth from fields like philosophy and mathematics, as well as the results of our everyday rational and logical mental processes.

Lower Right – “Experience”: This is the dimension of general everyday subjective experiences, as well as tacit knowledge. It includes both our personal religious experiences, and our subjective experience of being a person.

Upper Right – “Tradition”: Here is meant not only religious tradition, but also family and cultural traditions. All knowledge starts with “preknowledge” in the form of presuppositions that are inherited from our traditions.

Upper Middle – “Revelation”: This means primarily the Bible. Revelation is placed as ONE of several pointers to truth in that we still have to figure out what is meant by the revelation we have received in scripture. For Christians, scripture is the best pointer to the most important truths, but it still needs to be understood as a pointer in need of some interpretive work.

Some of you readers will have already recognized the roots of this model in the Wesleyan Quadrilateral as formulated by Outler.<sup>24</sup>

We understand human nature most clearly – that is, what is true becomes most clear – when there is greatest resonance between the information offered from Science, Rationality, Revelation, Tradition, and Personal Experience. As the sound waves change in amplitude and frequency, they sometimes resonate in the middle in a way that makes our understanding clearer. But sometimes the information is dissonant causing the signals to cancel, and our understanding of truth becomes less clear.

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<sup>24</sup> Outler, A. C. (1985). The Wesleyan Quadrilateral in Wesley. *Wesleyan Theological Journal*, 20(1), 7-18.

Finally, the most important and dynamic aspect of this model is that *dissonance indicates a need for tuning*. The knobs on each radio suggest the dynamic possibility of tuning what is coming from any particular source. Each domain has a range of acceptable interpretations of information from that source. Adjustments within this range of interpretations must be made using the criterion of more-or-less resonant with the other domains. Thus, when the information from these different sources is dissonant or discordant, our understanding becomes unsure, resulting in a need to make some adjustments somewhere.

The consequences of neurological damage and disease suggest an ever tightening link between neurobiology and the sorts of experiences reserved for the soul in body-soul dualism. Our traditional Christian understanding of the nature of human beings (that is, body / soul dualism), set in a field of such signals from science, creates incredible dissonance and suggests that some adjustments need to be made in one or both of these signals in order to achieve greater resonance. I believe that tuning is necessary in BOTH our understanding of neuroscience AND in our theological conceptions of the person.

We now return to the questions raised by the two opposing propositions. Theologically, there was the question, "If spiritual / religious experiences and moral agency are a manifestation of our souls, how can one account for the impact of brain disorder on these capacities and experiences?" This suggests to me an adjustment necessary in theology towards some form of monism or physicalism. The remainder of this lecture will suggest some possible adjustments in our theological understanding of human nature.

However, we also asked, "If humans are nothing-but biology, where is human value and dignity to be found? Are we biological automata or free moral agents?" These questions imply that some adjustment is also necessary in our understanding of

the implications of neurobiology and neuropsychology. I will devote the entire of Lecture 3 to suggesting how physicalism can be understood in ways that do not entail reduction of humanness to “nothing but” neurochemistry, neurobiology, and ultimately to subatomic physics. In terms of our understanding of science, there is need to, and reason to, formulate a nonreductive view of human neurophysiology.

Before proceeding, let me offer my definition of the position I am offering for your consideration as a viable alternative to body/soul or body/mind dualism: nonreductive physicalism.<sup>25</sup>

Physicalism refers to the idea that it is not necessary to postulate a second ontological entity, the soul or mind, to account for human capacities and distinctiveness. Soul and mind are physiologically embodied. Adoption of some form of physicalism is the adjustment I wish to suggest in the music being broadcast by Christian theology.

Nonreductive as a qualifier indicates that human behavior cannot be exhaustively explained by analysis at lower levels, such as neurophysiology or neurochemistry. Higher-level explanations supervene. Top-down causation exists. Thinking is efficacious. A nonreductive understanding of neuroscience is the adjustment that needs to be made in the signals coming from science.

The Implications of nonreductive physicalism can be understood in the following two parallelisms:

We ARE bodies, we do not HAVE bodies.

We ARE souls, we do not HAVE souls.

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<sup>25</sup> I am indebted to Nancey Murphy for giving me the correct philosophical terms for this position.

## VI. Adjustments Necessary in Theology (Anthropology)

If we adopt nonreductive physicalism, we must consider the question of what has become of the soul? That is, what has become of the properties of humanness that we have attached to the idea of a soul? This is the question we pursued in the book I edited with Nancey Murphy and Newton Malony entitled *Whatever Happened to the Soul?* Any physicalist understanding of persons that is truly Christian must account for those aspects of personhood that are attributed to the human "soul" or "spirit", particularly in New Testament discourse. The concept of a "soul" has carried meaning about humanness and personhood. How can this meaning be preserved without reference to a non-material soul?

In my own lay-theologizing, it seems to me that some of the more critical aspects of our theological understanding of personhood that have been attached to the concept of a soul would include the following:

- It has been the marker of human distinctiveness. The possession of a soul has been assumed to be what differentiates humans from the animal kingdom.
- It has formed our understanding of salvation. The gospel is believed by most Christians (at least by we evangelicals) to be about "saving souls" – repair of a defective inner part.
- It has been pivotal to our understanding of human spirituality. We have believed that becoming more spiritual persons means cultivating the inner life of the soul.
- It has provided the rationale for a particular form of ethical regard for our fellow humans. We must attribute particular value to persons, and afford them unique regard (as opposed to animals) because persons have souls and animals do not.

- The idea of a nonmaterial soul has given an easy solution to the imponderable mysteries regarding the nature of resurrection and the afterlife. In a dualist formulation, our bodies die and our souls live eternally.

In *Whatever Happened to the Soul?* I attempted to deal with these contributions of the soul-concept to a Christian understanding of human nature.<sup>26</sup> I first suggested that “soul” is a quality of humanness, not a thing. In order to make this clear, I used the terms “soul-ish” and “soul-ishness.” My intent was to endorse the concept of human uniqueness, but without resorting to designation of a separable, autonomous, non-physical part. I further suggested that human soul-ishness is best understood as the capacities and experiences of *personal relatedness*.

In order to capture any of the depth of human “soul-ishness”, the idea of personal relatedness needs to be considered in a multidimensional manner. There are three dimensions of personal relatedness that contribute to “soul-ishness”:

- The qualitative and quantitative differences between human and nonhuman inter-individual relatedness (differences in depth, scope, complexity, and range in time, space, and topic).
- The subjective (intra-personal) process of self-relatedness and self-representation.
- The experience of relatedness to God.

I have also made the point that these forms of relatedness are dependent upon, and emergent from, a basic set of human neurocognitive capacities. In my next lecture, we will talk about “emergence”. For now, the basic idea is that complex interactions between lower-level capacities can result in the emergence of new higher-level

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<sup>26</sup> W. S. Brown, “Cognitive Contributions to Soul” in Brown, W.S., Murphy, N. and Malony, H.N. (eds.) *Whatever Happened of the Soul? Scientific and Theological Portraits of Human Nature*. (Fortress Press, 1998) pp. 99-126.

capacities that cannot be explained by the activity of any of the lower-level parts. Thus, the deep forms of personal relatedness that I believe are “soulful” are emergent from our highest levels of cognitive and emotional functioning – which explains the susceptibility of both our interpersonal relatedness and our religiousness to brain disease and brain damage.

With respect to the soulful properties of human nature, there is a chain of emergence that can be reasonably imagined.

- First, higher human cognitive capacities emerge out of an expanding (either developmentally or evolutionarily) neurobiological system interacting with a human culture.
- Personal relatedness emerges as these human cognitive capacities are used in interpersonal interactions.
- Finally, “soulfulness” itself is the quality of being that emerges from the deepest experiences of personal relatedness (including a relationship with God).

In *Whatever Happened to the Soul?* I speculated on some of the cognitive tools that are necessary for the emergence of personal relatedness in sufficient depth and scope that we would refer to this relatedness as evidence of “soulfulness”. The cognitive capacities that I outlined were: language, a Theory of Mind, an episodic memory, conscious top-down agency, a future orientation, and emotional responsiveness.

In pursuing a Christian understanding of human nature within physicalism, we must also face the issue of human dignity. Where does one find human dignity in this formulation of a Christian theological anthropology without a “soul”. In *Whatever Happened to the Soul?* I argued that human dignity is established within networks of relatedness – specifically within 3 forms of relatedness:

- In the depth and sophistication of an individual's ability to relate to others.
- In the state of (and experiences of) being related to by a human community.
- In God's sovereign choice to be in relationship to humankind.

Let us explore further these three forms of relatedness. The first form of relatedness that contributes to souliness is the ability of humans to relate to others. While many animal species have noteworthy ability to relate to one another (e.g., packs of wolves or groups of chimpanzees), humans have dramatically enhanced capacities for relatedness. If we are on the same continuum, we are way down at one pole, distant from our nearest animal neighbors.

However, if souliness is only a matter of the ability of a person to relate to others, then there are troubling questions that arise. Persons with diminished relational capacity (e.g., an individual with autism) would have diminished souliness. Animals with greater relational ability (e.g., linguistically competent chimps) would have a modicum of souliness. Finally, there is the question of humanoid robots. Would an intelligent relational robot have a modicum of souliness? These problems can only be sorted out with reference to forms 2 and 3 of personal relatedness.

The second form of relatedness to consider is the experience of being related to by others. Human dignity and souliness also arise as an interpersonally competent community relates to an individual. What is more, relatedness can be asymmetric – that is, deep and significant relatedness can be carried on between two individuals, one of whom has much less capacity to sustain the relationship than the other. Thus, souliness can be maintained in those with diminished relational capacity by nesting the person with lesser ability within a community of more relationally competent individuals. If this be true, then animals or humanoid robots would experience souliness only if they were granted relational status within a relationally rich community. For example, the most successful attempt to teach language to a

chimpanzee occurred primarily because the chimp was admitted from birth within a community of human “teachers and care givers.”<sup>27</sup> Community-nesting not only resulted in a modicum of language comprehension by the chimp, but (according to anecdotal reports) also elicited and sustained relatedness far beyond the chimpanzee’s ability to sustain independently.

Finally, there is the issue of our relatedness to God. From a theological perspective, souliness would be primarily due to a relationship with God. It is God’s sovereign choice to be in relationship to humankind that accounts for the depth of human “souliness.” Thus, God’s choice to relate to humans is the primary source of dignity as a value attribution, and “soul” (or “souliness”) as a functional property of human nature.

With these thoughts in mind, let me suggest how I would reformulate our theological thinking regarding humankind by considering souliness to exist in relatedness? I would re-consider the properties of humanness that had been attributed to the soul in the following manner:

- Human distinctiveness and human dignity would lie to some degree in our enormously enhanced capacities for relatedness, but primarily in God’s offer of a unique form of relatedness to humankind.
- Salvation can readily be understood as establishment of relatedness to God, rather than repair of a defective part (the soul).
- Spirituality would exist in our relatedness to God who is spirit. Thus, spirituality would focus entirely outward from me to God (and to God’s creatures and creation), rather than inward toward my non-material soul.

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<sup>27</sup> See the description of the language and social competence of the Bonobo chimpanzee named Kanzi in: Sue Savage-Rumbaugh and Roger Levin, *Kanzi: The Ape at the Brink of the Human Mind* (New York: John Wiley and Sons, Inc., 1994).

- Ethical regard for other persons would develop out of my responsibility for other persons' souliness through relatedness. The foundational ethical motivation would be to establish and sustain as much inter-human and human-God relatedness as possible.
- Resurrection, rather than the continuation of the soul, we would emphasize resurrection of the body, that is, some form of reconstitution of our embodiment. But, of course, mysteries regarding the after life would remain.

## **VII. Summary and Prospect**

In this lecture, I have argued that dissonance in our view of human nature has been created by the increasingly large number of critical properties of humanness that have been shown to involve particular brain systems. These studies have come about because of new techniques for in vivo imaging of the distribution of activation within the awake and functioning human brain. The most difficult of these neuropsychological studies for Christians are the studies of brain function and religious experience.

I have suggested that our goal in integration is not that theology and neuroscience say exactly the same things about humankind, but that the theories and perspectives are resonant. In this regard, I have argued that the keys to resonance between the theological and neuropsychological portraits of human nature involve a physicalist reformulation of theological anthropology (which I have presented in this lecture), and a nonreductive understanding of human neuroscience (which I will discuss tomorrow). In tomorrow's lecture, I will deal with the threats of reductionism and determinism within a physicalist view of humankind.