Are We Wired for God?

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The developing discipline of neurotheology looks to the structures of the human brain to understand our religious experience. It sheds new light on the integral relationship between both mind and body, and spirit and matter, and contributes to an appreciation of the human person as one truly made for participation in Mystery.

Two monks were arguing about the temple flag waving in the wind. One said, “The flag moves.” The other said, “The wind moves.” They argued back and forth but could not agree. Hui Neng, the Sixth Patriarch, said, “Gentlemen! It is not the flag that moves, it is not the wind that moves, it is your mind that moves.” The two monks were struck with awe! (Schiller 1994, 332).

This short anecdote raises a fundamental question that has occupied the minds of thinkers for eons: How do we know reality? Today, researchers are revisiting that question with a particular view to religion. They are asking, how do we know the reality we name as God? As Christians we may answer this question by saying that we know God through revelation, grace, and creation. But scientists today are asking, how do we know God as biological human beings? What enables us to know God? The answer is given in one short phrase, the human brain. As Andrew Newberg states, “There is no other way for God to get into your head than through the brain’s neural pathways. . . . If God exists, the only place he can manifest his existence would be in structures of the brain” (Newberg et al. 2001, 13).

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For the first time in human history we are able to say that there is something about the physical structure of the human person that orients us to God. What we have for centuries called the “mind” is now considered to be integral to the “brain” (Albright and Ashbrook 2001, 164). Scientists today suggest that the brain and mind are two ways of looking at the same thing (Laughlin, McManus, and d’Aquili 1992). Neuroscientist Antonio Damasio indicates that the truly embodied mind encompasses its most refined levels of operation, those constituting its soul and spirit (Damasio 1994, 252). While the brain is the bodily organ that allows us to think, feel, and receive input from the external world, the mind is constituted by the thoughts and feelings themselves (Newberg and d’Aquili 2000, 54). Thus, if we speak about the “mind knowing God” or the “journey of the mind into God,” we are at the same time speaking of structures of the brain which are involved in the process of knowing and which enable us to perceive the reality we name as God.

If it is indeed the mind/brain that creates the world for us, then how does this complex human entity construct language, myths, and rituals that enable us to make sense of a reality we perceive and name as God? The discipline of neurotheology considers theology from a neuropsychological perspective (D’Aquili and Newberg 1999, 15). Neurotheology seeks to know how biogenetic structures of the human brain explain many aspects of religious experience, assuming that “there exists no reality intervening between the central nervous system and the environment” (Spezio 2001, 478). This article will focus on some key studies in neurotheology that highlight specific brain areas involved with religious experience in an effort to explore the religious nature of the human person and the human capacity for God.

Understanding the Brain

The human brain with its ten billion neurons and sixty trillion synapses is an amazingly fine-tuned organ that governs every human function. Scientists have known for years that we are “wired” for just about everything we do, from playing golf to playing piano. Now we are beginning to realize that the brain is also integral to the function of religious experience. Anyone who has ever seen a human brain must wonder how a three-and-a-half-pound structure that looks like a large head of cauliflower and feels like firm tofu could be so utterly complex. But complex it is. With its wrinkled look of layers and folds, the brain is comprised of incredibly dense fields of electrical-chemical connections. A scan of the brain could appear like the main street of Las Vegas lit up at night in three dimensions! The primary areas of the brain, the cortical lobes, are the main components of human function. The frontal lobes help us focus our “mind” on various tasks. Disorder in this area can result in loss of the ability to concentrate, to
plan, or to be goal-oriented. Some scientists have speculated whether or not the frontal cortex is the “seat of the will,” since damage to this area can result in flatness of affect and apathy and difficulty controlling emotion. The parietal lobes receive sensory information and allow us to situate ourselves in the world. This area integrates visual, auditory, and sensory information so that we may situate ourselves in time and space. We might say that the parietal lobe enables us to distinguish our “self” from the world. Whereas the occipital lobe is concerned with vision, the temporal lobe is involved with emotions and sexual behavior and is one of the prime areas of research today with regard to religious experience (D’Aquili and Newberg 1993, 178–83).

In addition to these cortical lobes, the brain has collective functions of brain structures called “cognitive operators” that help us think and feel and experience the world in a way we define as distinctly human. For example, holistic operators help us to see the world as a whole while reductionist operators enable the mind to consider the whole in parts. Causal operators enable the mind to interpret all of reality as cause and effect, and binary operators help the mind to make distinctions between opposites such as large and small, up and down. So the brain is not only organized but organized in such an exquisite way that everything we perceive to be the reality of our world is made possible by intricate connections and groups of connections (D’Aquili and Newberg 1999, 50–57). One might conceive of the brain’s function as a tightly woven clan of interconnected families of neurons with their local support systems.

Religious Experience and the Limbic System

The area of the brain that has received significant attention with regard to religious experience is the limbic system. Located at the edge of the temporal lobe, the limbic system is ancient, primitive cortex. The area was discovered in the 1930s by several neurologists. James Papez found that patients who died of rabies experienced fits of rage and terror before death (Kandel et al. 1991, 737). Upon autopsy of the patients, he found the rabies virus clustered in neurons deep in the brain. Pierre Broca named this area the limbic system because it borders the edge (limbus) of the brain stem (Ramachandran and Blakeslee 1998, 177).

The principal areas of the limbic system include the hypothalamus, the amygdala, and the hippocampus. The hypothalamus governs the outward expression of emotions and is linked to the autonomic nervous system. The amygdala controls and mediates all higher emotional functions such as love, friendliness, distrust, while the hippocampus modulates emotions and links emotions to memory and learning (D’Aquili and Newberg 1999, 37–41). Because the limbic system is involved with emotions such as love and aggression, it is not surprising that this
area is also involved with sexual behavior. Newberg and colleagues suggest that the neural machinery of transcendence may have arisen from the neural circuitry that evolved for mating and sexual experience (Newberg et al. 2001, 125). One can note a link between sexuality and religious experience, at least in the writings of the mystics who often describe their ineffable experiences in terms of “bliss,” “rapture,” and “ecstasy.” Researchers have also found that electrical stimulation of the limbic system produces responses that are involved with religious experience such as dreamlike hallucinations, out-of-body sensations, and illusions. R. Joseph writes that “the right hippocampus and amygdala and the right hemisphere in general appear to be directly involved in the production of religious imagery, including complex visual hallucinations, dream states as well as REM (rapid eye movements) during sleep. . . . Dreaming is abolished with right but not left temporal lobe destruction” (Joseph 2001, 111–12). The experience of souls, spirits, angels, and dreams are also associated with the limbic system, which may explain why these experiences are common to many religions (Joseph, 105–33).

Studies have shown that conditions such as food or sleep deprivation may activate the nuclei of the limbic system to the extent that subclinical seizure activity may ensue (Joseph, 128). Other conditions such as isolation, pain, self-mutilation, or meditation may also stimulate the limbic system, causing hallucinations and the secretion of enkephalins, which are endogenous morphine-like substances. Researchers have found that when the limbic system is stressed or deprived of normal modes of input (either sensory or emotional), the system may become hyperactive, strengthening circuits between the limbic system and other areas such as the frontal and parietal cortices, resulting in heightened religious experience.

One of the most interesting observations with regard to religious experience and the limbic system comes from patients with temporal lobe epilepsy. Epileptics with focal seizures in the limbic system often manifest intense emotional symptoms (Persinger 1993, 1997). V. S. Ramachandran, a neurologist who has done extensive research in this area, has described the religious emotions of patients with this disorder. Some patients report feelings of being “on fire,” which can range from intense ecstasy to profound despair, doom, or rage. Some have deeply moving spiritual experiences, including a feeling of divine presence and the sense that they are in direct communication with God. Others claim to have insight to the true nature of the cosmos, while still others may have an experi-
ence of absolute truth. Ramachandran performed galvanic skin response tests on several patients to see if indeed parts of the temporal lobe are selectively enhanced through epilepsy. He found that words, pictures, or images that were not religious, such as a burning building, a murder scene, or a dog, caused a minimal response in epileptic patients compared to significant responses in non-epileptic patients. On the other hand, images of the cross or of Jesus showed amplified responses in epileptic patients. This simple test, he suggests, supports the notion that selective enhancement of the limbic system is involved with religious experience (Ramachandran and Blakeslee, 185).

Ramachandran and Blakeslee report that epileptic patients usually have heightened emotions and see cosmic significance in trivial events. Hypergraphia or voluminous writing is also characteristic of their behavior. In a recent novel called *Lying Awake*, Mark Salzman tells the story of a Carmelite nun who is a mystical poet and an epileptic. After learning of her epilepsy and the possibility of treating it through surgery, the nun worries that she will lose her profound sense of God. At one point she states: “If what you have shown me these past three years has all been a mirage, then I am worse off now than I ever was. If I lose my sense of you, I lose everything” (Salzman 2000, 122). The notion that surgical treatment could obliterate her mystical insights leads the nun to question the meaning of her faith and the dependency of her faith on the experience of God.

Scientists like Ramachandran and Blakeslee do not know why epileptic patients between seizures have such profound religious experiences. One reason may be that the repeated electrical bursts within the limbic system may “facilitate” (kindle) certain pathways or may even open up new channels, thus producing heightened emotions (Ramachandran and Blakeslee, 182–88). Surprisingly, there are other neurological and psychiatric disorders, such as frontal lobe syndrome, schizophrenia, and manic depression, in which emotions are disturbed but do not result in religious experience. However, patients with temporal lobe epilepsy seem to have neural pathways that are enhanced by seizure activity, which may result in intense religious experience.

While Ramachandran and Blakeslee indicate that there are circuits in the brain involved in religious experience and which become hyperactive in some epileptics, such observations neither prove nor disprove the existence of God.
They do suggest, however, that neural substrates in the temporal lobes specialized for religious experience become hyperactive in epileptics. Such findings raise a number of questions. For example, what would happen if part of the temporal lobe were surgically removed? Could the person no longer have an experience of God? Conversely, can religious experience be induced through activation of the temporal lobes either through deprivation (food, sleep), drugs, or electrical stimulation? Perhaps the most fundamental question raised is, what makes a person “spiritual”? Scientists will admit that they do not know if the neural circuits are specifically for religion or whether they generate other emotions such as love or desire, which are conducive to such beliefs. It is tempting to speculate that there is a “God module” in the brain and that such a module is located in the area of the limbic system; however, such speculation needs to be made cautiously. What these findings do point to, however, is that spirituality involves the brain. For the first time in human history we are beginning to understand spiritual experience not as something apart from the physical human but rather bound up with human matter, that is, the matter of the brain. Thus, matter and spirit are no longer seen to be opposed but are indeed mutually related, if not one and the same. It is no longer a Christian privilege to proclaim—spirituality matters!

Mystical Experience

While research on epileptic patients has yielded interesting insights with regard to the brain and religiosity, others have been exploring the brain with regard to mystical experience. During the last thirty years, the late Eugene d’Aquili, a pioneer investigator in the area of neuroscience, developed a series of studies to explore areas of the brain involved in consciousness and religious experience. Andrew Newberg later joined d’Aquili in the investigation of the brain and religious belief, and their collaborative efforts resulted in the publication of *The Mystical Mind: Probing the Biology of Religious Experience*. Although d’Aquili died in 1998, Newberg has continued this research and recently published a more popular book, *Why God Won’t Go Away: Brain Science and the Biology of Belief*, that explores the relationship between the brain and religious experience for a general audience.

Striving to uncover the true nature of reality and how we relate to it, these two scientists have sought to identify brain areas and pathways that may be involved primarily in mystical union. The experimental subjects have included Buddhist monks and Franciscan nuns, all of whom have been long-term practitioners of prayer and meditation. By measuring changes in blood flow in these parts of the brain during periods of intense prayer or meditation using single positron emission tomography (SPECT), d’Aquili and Newberg have shown that the areas of
the brain involved with emotional, motivational, and sexual behavior are also involved with religious experience. They have focused on the state of absolute unitary being, which they describe as a “state in which the subject loses all awareness of discrete limited being and of the passage of time, and even experiences an obliteration of the self-other dichotomy” (D’Aquili and Newberg 1999, 109–10). In the language of Christian mysticism, absolute unitary being is the state of mystical union, which may be a positive blissful effect (via positiva) or an ineffable experience of God (via negativa).

D’Aquili and Newberg have mapped out the neural pathways involved in the experience of absolute unitary being. Basically they indicate that continuous prayer or meditation facilitates (or kindles) neural pathways between the limbic system and neocortical areas, not unlike that observed in epileptic patients. The limbic system is connected to higher-level thoughts so that we may have complex thoughts and assign emotional value to these thoughts. Thus, one may contemplate God, attain some insight, and back that insight with an emotional response (D’Aquili and Newberg, 38). During periods of intense prayer or mystical union, for example, one may have a profound consciousness of God and express feelings of rapturous love.

Seeking to understand the neural basis of mystical union, d’Aquili and Newberg found that persons who have practiced intense prayer/meditation for many years show decreased input to the orientation association area (in the parietal lobe), which is the area involved with spatial orientation and self-other dichotomy. This “deafferentation” or block of information to the right side of the parietal lobe causes a subjective sensation of pure space. Since space has no meaning except as a matrix in which to relate objects, during periods of intense prayer pure space is experienced as absolute unity or wholeness. At the same time, there is a block of information to the left parietal lobe which results in the obliteration of the self-other dichotomy. Combined with increased activity in the hippocampus, hypothalamus, and amygdala (the limbic system), this deafferentation “results in the subject’s attainment of a state of raptuous transcendence and absolute wholeness that conveys such overwhelming power and strength that the subject has the sense of experiencing absolute reality” (D’Aquili

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and Newberg 1999, 113). The researchers have described pathways for both the negative path of mystical union (*via negativa*) as well as the positive path (*via positiva*) (D’Aquili and Newberg 1993, 177–200). Both states that ultimately lead to the experience of absolute unitary Being are accompanied by the loss of all awareness of discrete limited being and the passage of time and the loss of self-other dichotomy.

What has been most intriguing for d’Aquili and Newberg is that the experience of absolute unitary Being is an experience of the “really real,” an experience both monks and nuns describe as being neither wholly objective nor entirely subjective. Rather, what they experience is both integral to who they are and yet transcendent to their being. This experience of the “really real” has impelled d’Aquili and Newberg to explore the question, what is the basic nature of reality? Is it primarily material or spiritual, objective or subjective? As scientists they want to affirm that material reality is fundamental, but the results of their research favor spiritual reality. Thus, they offer a compromise by saying: “God is created by the world (the brain and the rest of the central nervous system) and the world is created by God” (D’Aquili and Newberg 1999, 193; D’Aquili and Newberg 1996, 235–47). Their inability to separate the spiritual from the material or the external from the internal leads once again to the insight that spirit and matter are inseparable and, indeed, seem to be unified in what we call the human experience of God.

**Are We Wired for God?**

The research on brain science and the biology of religious experience is fascinating but at the same time we must ask, how should we interpret this data? Should we assume that humans have evolved specialized neural circuitry for the sole purpose of mediating religious experience? Is religion genetically encoded in the brain? Are we, indeed, “hard-wired” for God? It would be too naïve to answer these questions with a simple “yes” because the data is limited and the discipline of neurotheology is still in its infancy.

From an evolutionary viewpoint, one could interpret these findings simply in terms of self-maintenance. That is, if the brain has developed a capacity for religious experience, it is because religion has a self-maintenance function. It allows us to gain control over the environment; it diminishes anxiety so that we can perform necessary behaviors; it promotes life-sustaining behaviors; and it helps us develop and maintain societies that protect us (D’Aquili and Newberg 1999, 154–56). Recent studies have shown that religion can have positive effects on psychological and physical health. For example, meditation can lower blood pressure and heart rate, as well as decrease anxiety and depression (Peng et al. 1999, 101–07). So essentially, religion is beneficial to one’s health and the survival of
the species. As Newberg writes, “evolution has adopted this machinery, and has favored the religious capabilities of the religious brain because religious beliefs and behaviors turn out to be good for us in profound and pragmatic ways” (Newberg 2001, 129).

But the brain is also capable of self-transcendence, that is, it is able to move from one stage to another. Because of the brain’s capacity for transcendence, we are compelled to question its ability for religion. The word “religion” (re-ligio) means “to bind back to one’s roots,” and this “binding back” involves some type of transcendence. To ask, “Are we wired for God?” therefore, is to ground this question in a more fundamental question: Are we religious by nature? The ability of the brain to transcend, to go beyond itself, leads us to suggest that the human person is religious by nature—*homo religiosus* (Albright and Ashbrook 2001, xxi). Newberg states: “Religions persist because the wiring of the human brain continues to provide believers with a range of unitary experiences that are often interpreted as assurances that God exists” (Newberg, 129). But to suggest that we may be religious by nature is different from asking if we are wired for God. A religious nature may take a variety of forms and expressions, whereas to be wired for God presumes belief in a personal God.

We are “wired” for something. At the minimum, we can say that we are “wired” for an experience other than that of our immediate selves. Perhaps we can say that we are “wired” for relationship or for connectedness with an Other. Only those who believe in God, however, can ask if we are “wired for God,” for the question itself is a faith statement. It presupposes the existence of God and our relationship to God. What we need to keep in mind here is that neither faith nor the existence of God can be reduced to neural circuits. Faith is a gift of grace and can only be accepted in grace, and God is the ground of our being. A narrow interpretation of neurotheological data can easily lead to a conflation of God and brain, whereby the existence of God becomes contingent on the human brain. Newberg indicates that the main reason why God won’t go away is because our brains won’t allow God to leave. “Unless there is a fundamental change in how our brain works,” he states, “God will be around for a very long time” (Newberg, 37, 172). Indeed, God will be around for a very long time but not because of us; rather, because God is—well—God. And it is because God is the incomprehensible mystery who is the ground of our being that we must be somewhat suspect of drawing theological conclusions based on

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scientific data. However, the data does shed light on the human person's capacity for God. It provides substantive support to the traditional claim that the human person is *capax Dei*, that is, the human person has the capacity to know and love God. We are beginning to realize that the capacity for God is not an abstract concept but involves real biological structures of the human brain and specific circuits within the brain that mediate religious experience. The Jewish philosopher Martin Buber once wrote: “One cannot approach the divine by reaching beyond the human: one can approach it through becoming human” (Albright and Ashbrook 2001, xi). In the same way, we can say that our knowledge of God does not lie beyond the human brain but within its intricate parts and connections.

One of the areas where neurotheology sheds new light is the relationship between matter and spirit. In Western scientific thought, we still maintain a tension between matter and spirit emerging from the enlightenment. Damasio contends that in separating body and soul the Cartesian split of emotion and reason led to a breakdown of rationality itself (Damasio 1994, 259). Because modernity has so influenced our thinking with regard to these two entities, we are shocked when we discover that a material substance such as the brain has the capacity for transcendent or “spiritual” experience. For centuries, the Christian spiritual tradition maintained that the flesh had to be disciplined or subjugated to the spirit in order that the spirit could be in union with God. This emphasis on the primacy of the spiritual over the material, influenced by Hellenism, provoked harsh ascetical practices such as extreme fasting and sleep deprivation. However, it is now possible to speculate that ascetical practices did not “subdue the flesh” but rather stimulated the flesh or rather areas of the brain that resulted in intense spiritual experiences!

The observation that deprivation is associated with increased neural activity in the limbic system offers interesting insight to the basis of spirituality and may explain in part the intense religiosity of the saints. Throughout the history of Christian spirituality, one finds men and women undergoing extraordinary feats in their pursuit of God. Many of the medieval women mystics, for example, underwent severe fasts, induced self-mutilation in imitation of Christ crucified, and were sleep deprived due to long hours of intense prayer. Clare of Assisi practiced such extreme fasting that Rudolph Bell

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includes her among those with “holy anorexia” (Bell 1996, 123–27). In light of the new insights on the limbic system and religious experience, the religious fervor of the saints may indeed be due in part to changes in the brain induced by ascetical practices. Instead of taming the flesh to liberate the spirit, therefore, asceticism may foster the unity of or transformation between matter and spirit.

To speak of the “spiritual person” or one who is in a personal relationship with God (or with the ultimate ground of being) acquires new meaning in light of neurotheology. For whatever we are spiritually is bound up with what we are biologically and influenced by what happens to us physically. Yet, the very nature of transcendence, that which renders us *homo religiosus*, remains a mystery. We have physical structures that provide an innate capacity for transcendence, but why are we capable of transcendence? What impels us to seek relationship with another—beyond oneself? That is, why do we need/desire to meditate or pray at all? The insights of evolutionary biologists and cosmologists today can help elucidate the human capacity for transcendence by defining the place of humans in creation. Evolutionists tell us that humans are not only part of the fabric of the universe but emerge from the evolving history of the universe. This means that whatever we are as humans cannot be entirely different from what creation itself is. In this respect the question “Why do we humans experience transcendence?" is a limited question unless we can ask “How does the human capacity for transcendence relate to the rest of creation?"

For the very nature of an evolutionary creation suggests that transcendence is not unique to human beings but rather the whole of creation is transcendent. As St. Paul writes, “all creation groans and cries aloud for God” (Rom 8:22).

Theologians throughout the ages have noted that there is a dynamism in nature which culminates in the human voice of the conscious person and which we name as God. The renowned Jesuit theologian Karl Rahner claimed that self-transcendence is an effect of (God’s) Spirit which already dwells in matter (Rahner 1966, 161–68). Rahner’s notion of spirit within matter can be traced from patristic Fathers such as Irenaeus of Lyons to contemporary thinkers such as Pierre Teilhard de Chardin. Medieval Franciscan theologian Bonaventure described matter as having a spiritual potency, stating that matter “cries out for perfection” (Emery 1983, 195). In this respect, he indicated that matter is oriented to spirit and finds its completion in union with spirit. The human person, according to Bonaventure, is “spiritualized matter.” According to these thinkers, the progression from matter to spirit characterizes the whole of creation, culminating in the

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human person and, in particular, Jesus Christ who recapitulates creation. Rahner described the Incarnation as the fulfillment of humanity within an evolutionary world whereby the human’s self-transcendence and God’s self-communication are one (Rahner 1966, 171–72). Therefore, the capacity for spiritual transcendence that we see in humans already lies within creation itself. The transcendence of creation in its evolutionary progression leads to the human person and the person’s openness to God.

Contemporary Christian writers are again alerting us to the integral relationship between matter and spirit. We now understand the human person to be spiritualized matter in an explicit way, that is, through development of subjective consciousness, as Teilhard de Chardin indicated (Teilhard de Chardin 1960, 257–64). As part of the evolutionary trend, the human recapitulates the universe’s drive toward spirit. That is, what is observed in the human already exists potentially in the universe itself: the capacity for self-transcendence. What we need to keep in mind, however, is that self-transcendence is always a movement toward God, but God always remains infinite and beyond, as incomprehensible mystery, whose grace alone invites us—mere human finite, contingent beings—into the mystery. Thus while changes in brain patterns may lure us to affirm that we are “wired for God,” such data may also be deceiving, for it may lead us to conclude that the mystery of God is readily accessed by the human mind. But this mystery of the incomprehensible One lies beyond everything, including reality itself, and this mystery is ineffable.

References


