
Probing Neurotheology's Brain, or Critiquing an Emerging Quasi-Science

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Abstract

“Neurotheology” is the name that has been granted to a new quasi-scientific hybrid discipline to which the biological sciences (particularly neurology and neuropsychology) and religious studies contribute equally—at least in theory. The field’s intention is to examine so-called “religious experiences” and ascertain whether there might be some part of the brain that is largely responsible for sensations so classified, or if there is some neural area that manifests increased activation (especially and specifically) during incidents described as religious, mystical, transcendent, or similarly. However, instead of progressing toward greater knowledge of its subject, neurotheological research has stagnated, but not before establishing its boundary parameters: “Reductionism” on the one hand, epitomized by the works of Michael Persinger, and “Religionism” on the other, well represented by those of Andrew Newberg and the late Eugene d’Aquili. This paper examines the contributions of each perspective (and their camps of followers) as well as their oversights, and then presents suggestions for future research, to lend the field some balance and hopefully stimulate the solution of its quandaries.

Keywords

Alper, association cortex, attribution, Begley, belief, brain, Bulkeley, cognitive, d’Aquili, Damasio, Descartes, dualism, EEG, emotion, epilepsy, frontal lobe, God, God Spot, Hobson, monism, neuroeconomics, neuroepistemology, neurology, neurophilosophy, neuropsychology, neurotheology, Newberg, paranormal, parietal lobe, Persinger, person-centered, PET, psychology, psychosomatic, Ramachandran, reductionism, religion, religionism, religious experience, science, seizure, SPECT, temporal lobe, William James, unitary.

Introduction to an Age-Old Argument

Most fields of scientific inquiry, both experimental and theoretical, tend to be ongoing, and developments are always arising. So one of the key questions facing any new discipline or project is, at what point have you done enough research and found something out, to feel confident coming forward with your results? The field of neurotheology—all of it—has come forward too soon. It is still in its infancy yet makes statements as if they were emphatically true. But rather than the establishment of fact what we see in a survey of the field now is an establishment of the new science's parameters, the boundaries of its spectrum of thought.

Neurotheology attempts to discover whether there exists a biological component of the human body (or specifically—though not exclusively—the brain) that is responsible for either enabling and/or generating the experience of that which is called “religious.” But to say that the research is seeking a “God Spot” is to be blind to the social consequences that must be taken into account when assessing religious experience. Presumably, if a particular part of the brain were generating “religious experiences,” such happenings would manifest a higher degree of similarity than they do and would manifest similarly even outside a conducive social environment—that is, their forms would not be so socially contextualized but would be at least partly influenced by genetics. Neurotheology is an attempt to formulate a new hybrid science, borne out of the fusion of a natural science and a subject that straddles disciplinary lines between social science and humanities, by analyzing the interaction between biology and neuroscience in their social-spiritual contexts. While the field might be more accurately called “neuroreligion” because it does not concern itself enough with the nature of God to warrant designation as a theology, one could argue that the field is particularly interested in how humans relate to their deity—be that a particular god or gods, some esoteric or divine “force,” or a Nirvana-like state, perhaps what neurotheology pioneer Andrew Newberg calls the “Absolute Unitary Being” (Newberg 1999, 14; Bulkeley, 16).

Theology attempts a comprehensive understanding of God's nature just as the natural and social sciences attempt to fully grasp humanity and the world in which we live. But theology and other non-sociological religious studies operate without the experimental benefits of the hypothetico-refutational (a.k.a. the Newtonian) method, so they must resort to theory, conjecture, and myth as alternative ways of “knowing” their divine subject matter. Therefore, though neurotheology represents an amicable intellectual endeavor whose intentions are invariably pointed toward the furtherance of knowledge, the subject is fated to run into many of the classic roadblocks built into a religion-versus-secularity (or religion-versus-science) dichotomy. Because of the nature of the “divine,” without some consensus on what constitutes “religion,” how can we hope to test its facets, including religious experience?

The question is like the one we face every time elect to see a doctor: objectively, does it really mean anything to be “sick”? Westernized definitions of medicine consider illness that for which other cultures may have myriad complex and non-biological explanations, including possession, shamanism, omen, among many others. Even if other cultures view the body as the source of illness like we do, they may still consider employ different medical cause-and-effect paradigms, like the ancient Greeks who considered health a function of the balance among four “humors.” To minimize variation, we rely on criteria comprised of the signs and symptoms scientifically proven to be associated with a particular illness, to determine our ailments as objectively as possible. It is not difficult to determine whether one has a fever, for instance, and if so, to connect that fact with the known causes of somatic inflammatory response, and thereby surmise that something is wrong.

But what are those “objective” criteria when it comes to defining god(s), or the experience of them? The variation is so great that it is not possible to assess the situation without any regard for personal investment or social circumstances and announce that

one “has” religion as one “has” the flu—*or is it?* Herein lies the potential power and intention of neurotheology: according to the field’s global hypothesis, when any person has “religious experience,” regardless of what that may entail incidentally or culturally, there is at least a partial common ground in biology, and specifically in the brain. If the hypothesis is true, one should be possible to objectively validate whether something “religious” (whatever the subjective meaning of the word) has occurred. (It is not always clear, however, whether the physical sensation led to the cognitive label “religion,” or whether the thought induced the feeling.) But having theorized about a biological locus “attuned” to religious experience—not necessarily its source per se (which would deny the possibility of an external god) *nor* a “point of contact” in the Cartesian sense of the pineal gland (which would prematurely confirm the existence of an external god), but rather a circumstantial indicator that something curious is happening—we approach the point at which work in neurotheology until now has gone awry.

Assuming that such a locus does in fact exist, and that it is possible to test whether “religious experience” has taken place, how will it be possible to know *when* such an event to examine has taken place? Is it truly possible to strap a subject to a scanning device in a laboratory setting and instruct the person to “have a religious experience,” without skewing the experience simply due to the pressures of observation? Or, since many of the most profound religious experiences occur spontaneously and rapidly (as accounts from epileptics, as reported by Michael Persinger and V.S. Ramachandran, have shown) (Bulkeley, 9), do we need some way to be ever ready to monitor feelings of transcendence “on the fly”? After all, it would prove especially challenging to the idea of a neurological “fingerprint” and a brain locus dedicated to religious experience if sincere religious experience were reported without the are turning on, or if the same area activated unaccompanied by religious sensation? It seems many of these quandaries could be solved by a person-centered neurotheology, in which the responsibility of assessing religious experience is transferred from the researcher to the subject, who is, after all, the only one truly qualified to declare that such an event has taken place and deserves to be tested.

Neurotheology’s inspiration can be traced back as far as Descartes, who believed he had localized in the pineal gland (at the base of the midbrain) the point where the divinity of the soul joins the physical reality of the body. Since then, the pineal gland’s most important functions has been identified as integral involvement in circadian sleep-wake cycles and long-term homeostatic maintenance, stemming from its being the primary locus of secretion for the neurotransmitter melatonin (Beyer et al. 1998). More recently William James, the *de facto* godfather of religious psychology, lent some credence to the subject of medical psychology, but not too much: he recognized that all mentalities—including religion—have a biological/neurological/neuropsychological component that may be identified. But in his *Varieties of Religious Experience* and elsewhere, James asserts the value of *belief*—that is, the value placed by an individual on his or her own experience and what derivatively considered “religious”: “James would focus on the ‘pure experience’ of radical empiricism...‘any kind of relation experienced must be accounted as ‘real’ as anything else in the system” (Bridgers 2002, 4-5, 10-12). Discussing what he termed “religious genius,” James asked why among various people having a certain physical experience in common, some might see it as imbued with more profound meaning, while others might not; and likewise, why might some consider very different physical experiences to be equally religious?

Jumping forward nearly three-quarters of a century, the development of new, minimally-invasive, high-resolution tools such as electroencephalography (EEG), positron emission tomography (PET), and most recently, single-photon-emission computed tomography (SPECT), has ceded unprecedented ability to image the brain *in vivo* and piece together the intricate details of its operations under a multitude of conditions. While the interest had long been present, it was finally possible to look at the

brain and the mind not as distinct entities, but as functions of one another; for as experimental neuropsychology pioneer Antonio Damasio, Jr., once said: “There is no mind without the brain.”¹ But given their new powers of observation, it was not the mundane, everyday neurobiological functions that sparked the interests of the most visionary brain researchers, but rather the “highest” or “most human” functions of the brain-mind system, including imagination, dreaming, art, and religion, as well as more anomalous phenomena often paired with words like “psychic.” The quest to understand how the brain accomplishes its magnificent but elusive functions has been varied but prolific—and not always credible in its verbosity—with more scientists leading its various facts than would be feasible to discuss here. But suffice it to say that interest in “hybrid” neuroscience disciplines has grown exponentially over the past few years, with work being done in fields as varied as neurophilosophy,² neuroepistemology,³ neurotheology,⁴ what might be called “neuroaesthetics,”⁵ and most recently, neuroeconomics (Begley 2002).

In this essay we are chiefly concerned with the development of neurotheology, and “concerned” is indeed the operative word. To say that the subject is in its infancy would be to deny the theoretical and empirical strides its researchers have already made, but it would be equally irresponsible to claim that neurotheology is anywhere near the point where it knows enough to make broad, definitive statements about its subject: the brain-mind system and its interface with religion. In fact, the very valuable (if flawed by an often-one-sided adherence to its own world-view) research conducted thus far has very successfully laid the poles of the ideological spectrum that, because of its involvement with religion and matters of belief, will always underlie neurotheology. But the field has stagnated there, because no laboratory researcher has taken the initiative to fill in the gap between the extremes. This essay, then, is intended as a call for *empirical* study to investigate the theoretical middle ground—especially by molding a novel, person-centered methodology for neurotheology—as propounded by Graduate Theological Union dream psychology researcher Kelly Bulkeley and the Author of this paper.

Neurotheology is truly a new discipline, not as far as its subject—which has confounded philosophers, theologians, biologists, and anthropologists among others, since at least Ancient Egypt, where “at embalment, the brain was the only major organ to be removed and discarded, unequivocal evidence of their failure to recognise [*sic*] its function” (Nunn, 54)—but its feasibility.⁶ The technology is available to track religion as a thought process and religious experience as a psychosomatic phenomenon. But a schism splits the heart of neurotheological ideology: on what might be called the Right (because their views are more conservative and tend toward empiricism) is the “Reductionist” camp, exemplified by the work of Michael Persinger, a behavioral neuroscientist at Laurentian University in Ontario, Canada. On the Left (more progressive, open to new but possibly radical and even questionable research findings) is the “Religionist” group, led by Andrew Newberg and his late research collaborator Eugene d’Aquili, both of the University of Pennsylvania Medical School.⁷ We write “led by” because the Religionist perspective has generated a larger following since its promulgation than has the Reductionist’s, but it should be noted that work emerging from the Reductionist point-of-view has been highly publicized (Matthew Alper’s *The “God” Part of the Brain*, for example) because of its tendency to challenging outright the notion that a god exists at all, and it appeal to the popular credibility of atheistic and empiricist science.

Reductionism

In a nutshell, the grounding principle of the Reductionist perspective is that “the whole is composed of, and only of, the sum of its parts...the result is that God is actually the totality of all of the parts of the universe...[and] would not lead to the notion of a

transcendent God” (D’Aquili and Newberg 1999, 168).⁸ As it pertains to neuroscience in general and neuropsychology and neurotheology in particular, reductionism holds that thought in all its manifestations, including imagination, art, dreaming, and religion, takes root in the brain. As neurologist Larry Squire and Nobel laureate for medicine Eric Kandel write in their veritable handbook on neurology called *Memory*: “Biologists now have every reason to believe that all the activities of the mind arise from a specialized part of our body: our brain” (Squire and Kandel, ix). But it is controversial, to say the least, to intrinsically bind religion to the brain, particularly insofar as the divine goes part-and-parcel with religious conceptions: would such a connection mean that God (in any form—we use the term “God” here for convenience only) *is part of the brain*? Would that not make God mortal, and maybe specifically human? Do humans *fabricate* God—and could those who experience or understand God as a reality be *ill*?

Through his research Michael Persinger has advanced the theory of God as essentially a residual of biological experience, particularly epileptiform seizure. Persinger explicitly denies equating mental illness with the “God Experience”: in his autobiographical sketch posted on his academic department’s website, Persinger writes,

I assume that the human brain, its microstructure and intricate activity are the source of all human knowledge.... As a human being, I am concerned about the illusionary explanations for human consciousness and the future of human existence...I began the systematic application of complex electromagnetic fields to discern the patterns that will induce experiences (sensed presence) that are attributed to the myriad of ego-alien intrusions which range from gods to aliens. The research is not to demean anyone's religious/mystical experience but instead to determine which portions of the brain or its electromagnetic patterns generate the experience.⁹

But in his publications, he professes differently. Persinger’s relegation of religious experience to the physical gone awry drags us back to William James a century ago, as he decried medical materialism as presenting a valid—but only one—piece of the religious experience puzzle. His conception of emotion, which was later paired with that of Carl Lange to become known as the James-Lange theory of emotion, emphasized the legitimacy of the physical there as well, but it too could only account for part of the greater experience: the crux was in the cognitive label attached to the physical. If “religious experience” operates the same way, then subjectively it may have nothing to do with the sacred, transcendent, ultimate, or metaphysical, but objectively/empirically could be nothing more than a medical anomaly:

Both the occurrence of paranormal experiences and their rates of incidence are associated with specific types of neuronal activity within the temporal lobes. This linkage does not verify the validity of the content of the experiences but simply indicates that specific patterns of activity are associated with the experiences...That patients who display complex partial seizures with foci within the temporal lobes, particular the amygdala and hippocampus, report more frequent paranormal-like experiences has been known for decades...There appears to be a continuum of temporal lobe sensitivity along which all human beings are distributed...The propensity to infuse sensory experience with enhanced meaning, presumably associated with more electrically labile amygdaloid functions, results in more frequent experiences of deep and even cosmic personal significance in response to infrequent or odd events (Persinger 2001).

Unfortunately, Persinger has never explicitly cited religious attribution¹⁰ as the reason that physical phenomena like seizures (or pre-seizure “auras”) are imbued *post facto* with “enhanced meaning” (Fisch 1999, 257). His “God Belief” paradigm nevertheless

frames religion as a category into which the “*God Experience [that] is a normal and more organized pattern of temporal lobe activity*” can be situated along with its cognitive label, the “God Concept” (Persinger 1987, 4, 19; italics in original). His reductionist perspective successfully pares religious experiences down to scantily more than biological accidents—in particular, those originating in the brain and lacking clear causes, especially to the person experiencing them—to which the cognitive label of “religion” has been applied.

Religionism

If using a reductionist lens to view the brain-mind in its interface with religion *en route* to a neurotheology is flawed because it precludes any possibility that an external divine could be acting on an individual for whom religious experience is very much real, then the perspective of the “Religionist” is equally flawed from a scientific vantage point for too self-assuredly pronouncing a god’s existence. After all, as philosophies on perception and empiricism have for millennia debated, the *only* way to perceive the existence of a divinity is through the self (by whatever means), and that leaves its *objective* existence open to scrutiny. To assume that the brain is specially designed to “tune into” whatever god designed it (how else could it be so specially tuned?) is to risk skewing data through confirmation bias in the name of a pro-religion agenda; do the brains of atheist lack such a brain center or, conveniently, is such a center just not functioning properly?

In what seems at first glance to be a doubling-back toward Reductionism, Andrew Newberg, whose research epitomizes Religionism, admits that,

In a reductionist sense...religious experience is only imagined neurologically, that God is physically ‘all in your mind’...Neurology makes it clear: There’s no other way for God to get into your head except through the brain’s neural pathways (Newberg et al., 36-37).

Moreover, on his website, Newberg refrains from asserting or denying the existence of a divinity, thus keeping himself free from association with any particular religious framework:

While acknowledging that neuroscience cannot unravel the puzzle that perpetually entrances the human psyche—did God create our minds or did our minds create God?—Dr. Newberg does maintain that neuroscience can elucidate the nature of mystical experiences, their importance in human evolution, and why the abiding need for a concept of God is imperative for the survival of the human species.¹¹

Newberg and d’Aquili “want to establish a framework within which an analysis of theology from the perspective of the mind and brain may be considered...science and religion not only are brought together but also are essentially considered to be one and the same thing” (Newberg and d’Aquili, 10). Still, in their neurotheological manifesto *The Mystical Mind: Probing the Biology of Religious Experience*, which Newberg has described as “an attempt to construct a model,”¹² Newberg and d’Aquili refer to “a state of altered consciousness that we have previous termed absolute unitary being (AUB)” (Newberg and d’Aquili, 14). They continue: “If the mind and brain are responsible for all our experiences, then they are also the mediator for our experience of God. Thus it may be absolutely necessary to employ the study of the mind and brain in order to understand fully the relationship between human beings and God” (Newberg and d’Aquili, 16). On the one hand, Newberg equivocally admits that “whether or not God exists ‘out there’ is something that neuroscience cannot answer...or whether the person is creating the [experience] in her own mind.” But on the other, his research seems to concede (as has the cornucopia of work built upon his) that an external God exists who can in fact be *experienced*: the claim inheres that either the divine can be sensed by

ordinary means, or that “we possess such an instinct...what we could perhaps call [as Matthew Alper does] a ‘spiritual’ or ‘God’ part of our brain” (Alper, 62).

Reconciliation and Progress

Although it may seem that this paper detracts from the accomplishments of either Persinger or the Newberg and d’Aquili team, it should be stated that both sides have made great strides toward the formulation of a neurotheological model for the interface of brain-mind system in religion. Persinger and the Reductionist view have elucidated the dual roles of the “disordered” brain and cognitive attribution in the experience of the “religious,” while at the same time relegating religious experience to entropy: “God” is *generated*. Newberg, d’Aquili, and the Religionist perspective have made a connection between those experiences identified as “religious” and the anomalous bodily states that seem to accompany them, but they view the bodily states as being the result rather than its cause: “God” is *perceived*. But neither side of the neurotheological coin can tell the whole picture, because each considers the reality of religion from its own perspective and seems largely inclined to ignore the other’s insights.

In his paper “The Evolution of Wonder: Religious and Neuroscientific Perspectives,” Kelly Bulkeley takes the first necessary step toward a reconciliation of the disparate positions, which I will elaborate and extend. Bulkeley situates himself near the middle of the neurotheological spectrum (though more distanced from the Reductionist perspective, because he feels “it’s an absurdity to speak of wonder, or religion, or God as ‘located in’ or ‘caused by’ a specific region of the brain”) (Bulkeley, 10). His compromise proposal validates religious experience and localizes it largely to the brain, but he differs from Newberg and d’Aquili *as well as* from Persinger in that he rejects any hard-wired “religious experience pathway”:

In experiences of wonder the association cortex [of the brain] is pushed beyond its normal range of functioning and forced to make sense of extremely unusual input. I believe the creative results of that integrative effort by the association have played, and continue to play, an influential role in the world’s religious and spiritual traditions. I also believe that the world’s religious and spiritual traditions have played, and continue to play, an influential role in the ontogenetic development of the association cortex, that is, in prompting an expanded range of integrative functioning in this area of the brain through the course of an individual’s life (Bulkeley, 12).

Bulkeley’s proposition has brought us to the point at which neurotheology can reinitiate progress toward an understand of the brain-mind interface in religion: a *person-centered neurotheology*, which recognizes that human biology probably does have a tendency toward religious experience insofar as we have the capacity for such esotericisms. Yet at the same time, the person cannot be removed from the equation and replaced with a mass of autonomous neurons, because even if it were possible to identify a fingerprint for experiences called “religious,” without a person to consider such experiences to be sources of wonder, they would certainly have no meaning, and probably no function either.

In neurotheology, as in dream research, what can be thought of as the “subjective” and “objective” components are both visible: there is a biological fingerprint that unambiguously identifies a phenomenon’s occurrence, and there is the cognitive label attached to that particular fingerprint; diagrammed, this dual-input explanation for religious experience resembles the Schacter-Singer Two-Factor theory of emotion. The question is, which comes first?—the experience (e.g. epilepsy leads to transcendence), the label (e.g. the expectation of God leads to ecstasy), or do both take place both simultaneously (i.e. a *mélange* of physical experiences is considered “religious” if and

only if it conforms to prior expectations or no other title seems sufficient). Regardless of what has made the decision, there is only one who is consistently capable of assigning meaning to the physical and *reporting* it as having religious value: the one having the experience.

So why does current neurotheological research—from both the Reductionist and Religionist sides—let doctors in lab coats armed with a battery of neuroimaging tools but a perspective that is fundamentally Other, decide whether religious experience has taken place? Persinger examines epileptic patients (particularly those suffering the temporal lobe variety) using EEG, SPECT, and related methods, and concludes that what they determine to be religious experience is probably just a misplaced attribution attached to seizure or a pre-seizure aura.¹³ Newberg and d’Aquili describe “waiting for Robert [a devout Buddhist and accomplished practitioner of Tibetan meditation] to tug on the twine, which will be our signal that his meditative state is approaching its transcendent peak...our cue to inject a radioactive material into a long intravenous line...into a vein in his left arm[; they also use PET]” (Newberg and d’Aquili, 1, 3). Surely they cannot believe that the psychophysiological fingerprint of meditation in a laboratory setting, performed while having to remain conscious enough to tug on a string, will be the same as when the practice is conducted in the serenity of a mountain cave or the security one’s home, no matter how proficient the meditator! The subtle but inevitable effects of such an environment on the ability to mimic exactly the neurology of a religious, transcendental, or even typical meditative state hearkens to Bulkeley’s comment that “the tremendously complex neural interactions in each individual’s brain means that, in neurological terms, no two [instances] are ever...exactly the same experience. On strictly neuroscientific grounds, a universalism like that proposed by Newberg cannot be maintained,” let alone tested (Bulkeley, 16). Yet no one has bothered to ask the patient what he or she believes to be religious experience, and then followed up on those answers by assessing and cataloguing the experiences rather than trying to refute them. Judging by Persinger’s (and his fellow Reductionists’) work, one would think that there even exist some objective criteria against which the validity of religious experience can be judged. But with such experiences continuously being dismissed, how can the data so imperative for constructing such a criteria be assembled? James would not be pleased with the closed-minded filter through which reports of religious experience are considered, but he might just as well be disturbed by a lax scientific rigor that entirely fails to scrutinize reports of religious experiences.

It would be irresponsible to pronounce the methodological flaws currently undercutting the effectiveness of neurotheology as a research field without putting forth some suggestion of how the discipline may get itself back on track and perhaps, someday, even find some technological use for its knowledge. The importance of a person-centered neurotheology has been emphasized: because of differences in cognitive labeling, to one person, meditation may be self-reported as religious, while to another, it may be simply relaxing—even though the brain scans in both subjects prove to be *identical*. Similarly, praying before a statue of Christ may be reported as religious by one person and might affect no change in another: neuroimaging scans will find that similar observations of the statue induce similar patterns of brain activity, but since only one attributes meaning to it, the difference cannot be totally neurophysiological.

Even more interesting—and supportive of the distinct neurological fingerprint notion for “religious experience” idea—would be if EEG, PET, SPECT or another assessment tool found an identical (or statistically significant) match between the brain functions of the subject reporting meditation as religious and the one reporting prayer before the statue as such, because the two behaviors are completely different aside from their cognitive label. Which begs the theoretical question: does “religious experience” experience have to be physical in nature (e.g. meditation or some other such action) or can it be mentally induced (e.g. through prayer or thoughts about God, etc.)? Consider

the following questions as a possible next step toward broadening the understanding of what constitutes or leads to “religious experience” and/or constitutes its biological components.

1. If a subject is exposed to images of angels or devils—polarized religious images—will a fear response be induced (marked by pronounced engagement of the amygdalae) by one, and a pleasure/comfort/bliss response (marked by the co-activation of bilateral frontal dopaminergic loci) by the other?
2. Furthermore, because of their “charge” within the religious tradition, will the Satanist exhibit a reaction of fear and aversion to angels as a Catholic might to demonic images? Will the Satanist find comfort in demonic imagery as the Catholic might in the presence of angels?
3. Does group affiliation have anything to do with the types of behaviors that will induce “religious experience”? In other words, is there some relationship between religious affiliation and pain/pleasure thresholds? For example, if one’s particular religious trajectory calls for it, could masochistic or fetishistic actions lead to religious experience? And if there does prove to be a religiously contingent difference, might the higher pain tolerance correlate with a greater affinity for (or less aversion from) traditionally painful notions like Hell?

Conclusion

At the moment, neurotheology’s application potential is limited beyond the scientific ideal to better know the human world and condition, though there are some interesting possibilities for entertainment and therapy. Imagine: the potential profitability of electronically inducing supernatural experiences rather than leaving many people hungry for transcendence to rely on mind-altering substances to do so (as some *bona fide* religions do, like those Native American peyote traditions); the medical value of being able to physiologically validate (or invalidate) the claims of those who self-report or are diagnosed as having a “God complex”; and the therapeutic value of being able to “ask God” (at least, in virtual reality) why a loved one died. But with an understanding of how religion and an individual’s brain-mind system interact on the personal level—the goal of a person-centered neurotheology—the broader implications could extend into the realms of politics and governance, for example. For better or for worse, if the field of neurotheology wishes to progress with any hope of sustainability and applicability, it must refrain from letting the scientist infringe upon and dictate the religious experience being assessed. Because Reductionist and Religionist perspectives each see only part of the landscape of the religious mind, and the researchers’ jobs should extend only to the point of analyzing reported religious experiences, including, possibly, their own.

References

- Alper, Matthew. 2001. *The "God" Part of the Brain: A Scientific Interpretation of Human Spirituality and God*. New York: Rogue.
- Begley, Sharon. 1998. "Science Finds God." *Newsweek*. July 20:44-49.
- _____. 2001. "Religion and the Brain." *Newsweek*. May 7:50-57.
- _____. 2002. "This Is Your Brain. This Is Your Brian On a Surging Stock." *Wall Street Journal*. 15 November:B1.
- Beyer C.E., Steketee, J.D., and Saphier, D. 1998. "Antioxidant Properties of Melatonin—An Emerging Mystery." *Biochemical Pharmacology*. 15 Nov. 56(10):1265-72
- Bridgers, Lynn. 2002. "Mysticism and Monism: The Paradox of Pluralism in William James's Varieties." Paper delivered at the Annual Meeting of the American Academy of Religion, Toronto, Canada, 23-26 November.
- Bulkeley, Kelly. 2002. "The Evolution of Wonder: Religious and Neuroscientific Perspectives." Paper delivered at the Annual Meeting of the American Academy of Religion, Toronto, Canada, 23-26 November.
- Fitch, Bruce J. 1999. *EEG Primer: Basic Principles of Digital and Analog EEG (3rd ed.)* Amsterdam, The Netherlands: Elsevier.
- McCauley, Robert N. "Distinguishing Theology from Science and from Religion: Comments on Feit and Day." Delivered before the Critical Theory and Discourses on Religion section at the Annual Convention of the American Academy of Religion, Atlanta, Georgia, USA, November 22-25, 2003.
- Neurotheology* (ed. Rhawn Joseph). 2002. San Jose: University Press, California.
- Newberg, Andrew B. and Eugene G. d'Aquili. 1999. *The Mystical Mind: Probing the Biology of Religious Experience*. Minneapolis: Fortress.
- Newberg, Andrew B., Eugene G. d'Aquili, and Vince Rause. 2001. *Why God Won't Go Away*. New York: Ballantine.
- Nunn, John F. 1996. *Ancient Egyptian Medicine*. Norman: University of Oklahoma Press.
- Persinger, Michael A. 1987. *Neuropsychological Bases of God Beliefs*. New York: Praeger.
- _____. 2001. "The Neuropsychiatry of Paranormal Experiences". *Journal of Neuropsychiatry and Clinical Neuroscience*. Fall 13(4):515-524.
- Squire, Larry R. and Eric R. Kandel. 1999. *Memory*. New York: Scientific American Library.

- Vila, F.J. Rubia. 1994. "Annotations for Neuroepistemology." *Anales de la Real Academia Nacional de Medicina* (Madrid, Spain). Mar. 111(3):643-657.
- Woodward, Kenneth. 2001. "Faith is More than a Feeling." *Newsweek*. May 7:58.

Notes

- ¹ In discussion, following a lecture at Harvard University, 2000.
- ² For a seminal work in the field, see Patricia Smith Churchland, *Neurophilosophy: Toward a Unified Science of the Mind-Brain* (Cambridge, Massachusetts: MIT Press, 1986).
- ³ For a variety of reasons about which we can only speculate, but perhaps due mostly to insufficient knowledge of both philosophy and neurology by specialists in one field or the other, the twin subjects of neuroepistemology and neurophenomenology never advanced much beyond the initial interest, even within academia. But for some general introduction to the subject, see F.J. Rubia Vila's article "Annotations for Neuroepistemology" in *Anales de la Real Academia Nacional de Medicina*.
- ⁴ Since the writing of this paper, a new compendium of articles about the field of neurotheology has been released, aptly called *Neurotheology* (ed. R. Joseph, 2002) and featuring contributions by leading researchers writing from their widely varied disciplines of expertise. However, because neurotheology is a field attracting both academic and public attention, the Reader would be well advised to consider the credibility of each author's works beyond his or her respective chapter in the edited volume.
- ⁵ "Neuroaesthetics" is a name that might be appropriate for a hybrid field yet to emerge explicitly but for which seeds have already been planted. Semir Zeki of University College, London, contributed a chapter titled "Art and the Brain" to Gerald M. Edelman's edited volume *The Brain* (New Brunswick, NJ: Transaction Publishers, 2001), and J. Allan Hobson, psychiatrist at the Harvard Medical School and pioneer of dream and sleep psychophysiology, wrote "From Angels to Neurons: Artists and Scientists Envision Dreaming" for the journal *Cerebrum* (Fall 1999, 1(2):63-78).
- ⁶ In a commentary to this paper as it was delivered at the Critical Theory and Discourses on Religion section of the 2003 American Academy of Religion Annual Meeting (November 22-25), Dr. Robert McCauley, philosopher of cognitive science and mind at Emory University, made several interesting points.

But one I especially believe should be included here is a response to my assertion that neurotheology is a "new hybrid science," or as the title of this paper calls it, "an emerging quasi-science." McCauley responded, empathically, that "it is neither. Newberg and D'Aquili are right to describe their project as *neurotheology*, because it is, *finally*, a *theological*, not a *scientific*, project.⁶ Feit is correct to compare it to what he calls other "hybrid neuroscience disciplines"...Where he goes wrong is in thinking that these new programs of research are *neuroscience* disciplines. They are not. Instead, they are proposals...that take inspiration from and are informed by the methods and findings of the neurosciences...Neurotheology is no different. It is a theological project inspired by neuroscientific findings. Feit's accurate account of Newberg and D'Aquili's ultimate project as "too self-assuredly pronouncing a god's existence" not only corroborates my reading of what neurotheology is but also targets its principal weakness[:]...the most straightforward interpretation entails *presumptions* on [Newberg and D'Aquili's] part about the existence of God and about humans' interactions with God in the course of their religious experiences. The point, of course, is that such moves beg the question of God's existence, especially in the face of the availability of simpler, more consilient explanations of their putative evidence."

In other words—and I think McCauley's comment leads well to this question—in assessing the weight of neurotheology's "findings" (even those data gleaned through questionable research methods) we must ask ourselves not only *whether or not* neurotheology is a science, but whether or not *it wants to be* considered a science. The standards of evidence are completely different if the intention is to merely lay out a theoretical model of the psychosomatic effects of religion (one that, as Newberg once told me, merely works to reconcile acquired data and has an interest in "fitting" the data to the model, instead of vice versa), or if the intention is to actually *prove*, with sound and replicable laboratory procedures, that a causative relationship exists between so-labeled "religious experiences" and observable neurological, biological, and psychoemotive events. Either way—whether neurotheology's goals fall under the rubric of religious studies or neurosciences—the appellation "theology" is misplaced, as no "scientific" neurotheology research has attempted to understand the function of theology *per se*, which is to understand the Divine. (The closest attempt to understand the

mind-body interaction as a dual function of spirituality and ecology takes place in Matthew Alper's *The God Part of the Brain*, but it hardly qualifies as scientific, being instead the author's personal reflection on the subject.)

- ⁷ "Religionism," which I have so-named for clarity's sake, has also been called "biogenetic structuralism" by pastoral psychologist David Hogue in his comments respondent to the Religion and Social Sciences section of the 2003 American Academy of Religion Annual Meeting (November 22-25).
- ⁸ See also "God, Humanity, and the Cosmos Topic: An Examination of Reductionism", *The Meta-Library*, <<http://www.meta-library.net/ghc-redu/anexa-body.html>>
- ⁹ See the published website for the Neuroscience Research Group at Laurentian University: <<http://www.laurentian.ca/neurosci/persinger.html>>
- ¹⁰ That is, the assignment of meaning, significance, power, or value to religion, oftentimes because the event being attributed seems too irrational or ineffable to be satisfied by a more mundane explanation. See also J.S. Feit. "A (New) Typology of Religious Psychology: Relating Social Context, Attribution, and Affiliation." Available online at <<http://citizenculture.com/about/index.html>>.
- ¹¹ See Andrew Newberg's Internet web site: <www.andrewnewberg.com>.
- ¹² In telephone discussion, week of June 10, 2001.
- ¹³ Persinger's research findings are discussed in the following studies, as well as in his book titled *The Neurophysiological Bases of God Beliefs* (New York: Praeger, 1987): See the following studies: Persinger, M.A. "Paranormal and Religious Beliefs May Be Mediated Differentially by Subcortical and Cortical Phenomenological Processes of the Temporal (Limbic) Lobes." 1993. *Perceptual and Motor Skills*, Feb. 76(1): 247-251; Persinger, M.A. and Koren, S.A. 2001. "Experiences of Spiritual Visitation and Impregnation: Potential Induction by Frequency-Modulated Transients from an Adjacent Clock". *Perceptual and Motor Skills*. Feb. 92(1):35-36; Skirda, R.J. and Persinger, M.A. 1993. "Positive Associations Among Dichotic Listening Errors, Complex Partial Epileptic-like Signs, and Paranormal Beliefs". *Journal of Nervous and Mental Disease*. Nov. 181(11):663-667; Persinger, M.A. 1991. "Preadolescent Religious Experience Enhances Temporal Lobe Signs in Normal Young Adults". *Perceptual and Motor Skills*. Apr. 72(2):453-454; Persinger, M.A. 1984. "People who Report Religious Experiences may also Display Enhanced Temporal-Lobe Signs". *Perceptual and Motor Skills*. Jun. 58(3):963-975; Persinger, M.A. 1984. "Striking EEG Profiles from Single Episodes of Glossolalia and Transcendental Meditation". *Perceptual and Motor Skills*. Feb. 58(1):127-133.