

Brain Science & The Biology of Belief

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In a small, dark room at the lab of a large university hospital, a young man named Robert lights candles and a stick of jasmine incense, then settles to the floor and folds his legs easily into the lotus position. A devout Buddhist and accomplished practitioner of Tibetan meditation, Robert is about to begin another meditative voyage inward. As always, his goal is to quiet the constant chatter of the conscious mind and lose himself in the deeper, simpler reality within. It's a journey he's made a hundred times before, but this time, as he drifts off into that inner spiritual reality--as the material world around him recedes like a fading dream--he remains tethered to the physical here-and-now by a length of common cotton twine.

One end of that twine lies in a loose coil at Robert's side. The other end runs beneath a closed laboratory door and into an adjoining room, where I sit, beside my friend and long-time research partner Dr. Eugene D'Aquili, with the twine wrapped around my finger. Gene and I are waiting for Robert to tug on the twine, which will be our signal that his meditative state is approaching its transcendent peak. It is this peak moment of spiritual intensity that interests us.

For years, Eugene and I have been studying the relationship between religious experience and brain function, and we hope that by monitoring Robert's brain activity at the most intense and mystical moments of his meditation, we might shed some light on the mysterious connection between human consciousness and the persistent and peculiarly human longing to connect with something larger than ourselves.....

As my first installment on Metanexus regarding our recent book entitled, *Why God Won't Go Away: Brain Science and the Biology of Belief*, there are several primary points that require mention. *Why God Won't Go Away* is the culmination of almost 25 years of research into the relationship between the brain and religious experience. It strikes at the heart of questions such as: What makes something spiritual? Why are religious experiences so powerful? and What can religious and mystical experiences tell us about the mind and even about reality? Dr. Eugene d'Aquili initiated this groundbreaking research almost 25 years ago with an analysis of religious experience in ancient cultures. As human beings and human culture developed, so did religions and associated religious experiences. Today, there is a tremendous amount of information about the myriad varieties of religious experience. We also have a much greater understanding about how the brain and mind work. *Why God Won't Go Away* utilizes this knowledge to forge an integrated approach to understanding religious and mystical experiences. It describes this research in terms that are understandable to the scientist and non-scientist. The overall goal of this book is to help to facilitate a dialogue regarding this nexus of science and spirituality and to allow everyone to feel comfortable addressing these issues regardless of their perspective. We also realize that science is limited in what it can tell us about these experiences. Thus, we will explore not only how science can inform us about religious experience, but can also examine the implications that such experiences have with regard to science.

This book is also based on neurophysiological research that has investigated how the brain

works in a variety of circumstances. These studies have helped to advance our understanding of how different parts of the brain work, and more importantly, how they work together. Research over the past two decades has also begun to explore the relationship between brain function and body physiology. Thus, not only can we describe what is happening in the brain, we can measure the changes to the rest of the body associated with various brain states. With this information, we can begin to explore in detail, how religious and mystical experiences impact our minds and bodies.

Ultimately, we can consider what such an analysis leads to with regard to religion and theology. The implications of this research are far reaching, profound, and allow us to consider religious experience in new ways. These topics, considered near the end of this book, will present challenging issues for religion and theology.

It should also be mentioned with sadness that Dr. d'Aquili passed away prior to this book being published and so could not enjoy seeing this work to completion. However, his work and ideas that are expressed in this book reflect his creativity and intelligence. He truly was a pioneer in the field of science and religion, and in particular to the study of the biological basis of religious experience. Fortunately, Dr. Newberg will continue to pursue these issues to attempt to bring an even greater understanding of religious experience.

As the field studying the biology of religious experience advances into the next millenium, continued improvements in our abilities to study the brain coupled with better methods of measuring the subjective state of religious experiences will refine our understanding of the mystical mind. However, the ideas presented in this book represent the most up-to-date knowledge and the most complete synthesis of information currently available. The first installment will thus consider several basic principles of brain function as it relates to human experience, and in particular, religious experience.

The autonomic nervous system is traditionally understood to be composed of two sub-systems, the sympathetic system and the parasympathetic system. The sympathetic system subserves the so-called fight-or-flight response and is the physiological base of our adaptive strategies either to noxious stimuli or to highly desirable stimuli in the environment. In short, the sympathetic system causes a sense of arousal. The other part of the autonomic nervous system is the parasympathetic system. This system is essentially the antithesis of the sympathetic or Arousal System. The parasympathetic system is responsible for maintaining homeostasis and conserving the body's resources and energy. The parasympathetic system is part of a more global neuronal circuitry which we have called the Quiescent System.

The Arousal System and Quiescent System have often been described as "antagonistic" or "inhibitory" to each other, but studies suggest that they can sometimes function in a complementary manner. Normally, increased activity of one tends to produce a decreased activity in the other. This helps prevent an excess of the activity of either system. However, sometimes these systems can be driven to maximal activity despite the protective antagonistic mechanism. When this occurs, one can induce a "reversal" or "spillover" phenomenon. This spillover effect occurs when continued stimulation of one system to maximal capacity begins to produce activation responses (rather than inhibitory) in the opposite system. This state is

relatively rare and requires intense driving of one of the systems, beyond its normal capacity and beyond the inhibitory effects of the other system. If intense stimulation of the same system is continued, one can attain the even rarer state which involves maximal simultaneous activation of both the Arousal and Quiescent Systems.

With regards to "higher" brain function, we can consider how various brain structures might interact to provide us with certain basic brain functions. We have called these basic brain functions "cognitive operators" since they refer to specific ways in which the brain operates on the sensory and cognitive input arriving at the brain. We have described seven of these operators, however, we will consider briefly only two of the most important ones regarding religious experience -- the holistic operator and the causal operator. The other operators also have important roles regarding religious experience, however, these appear to be the most relevant.

In its basic form, the holistic operator allows us to view reality as a whole or as a gestalt. In other words, this operator helps to give us the big picture. This ability allows us to experience a given situation in a more global context. A number of experiments involving both animals and human beings have indicated that the parietal lobe (toward to the back, top part of the brain) in the right brain hemisphere is intimately involved in the perception of spatial relations. More specifically, the perceptions generated by this area are of a holistic or gestalt nature. Thus, we have proposed that the holistic operator likely resides in the parietal lobe in the right hemisphere. In religion, the holistic operator might allow us to apprehend the unity of God or the oneness of the universe. Regardless of the particular object or group of objects involved, whenever one considers or perceives the global or unitary perspective of things, one is employing the holistic operator.

The causal operator permits reality to be viewed in terms of causal sequences. This operator seems to have played a significant role in the development of human science, philosophy, and particularly religion. In its basic function, the causal operator tends to impart a sense of causality on all of the events that we observe. Thus, this operator forces us to question why we are here, why does something work the way it does, and what created the universe. In all of these, and in every other instance, we want to know what is the cause that lies behind every event that we experience. Thus, we would suggest that it is the mind or brain itself that is designed to seek out causality. Our brain functions in such a way that it tries to find the cause of all of the things it experiences. If this is the case, then it is a biological necessity for us to seek out causality. Furthermore, there is evidence that our drive to determine causality may be present even as early as infancy. The causal operator has often led to the development of myth formation and in particular, religious beliefs. Religions, in general, offer an answer as to what ultimately causes things to happen in this universe -- power sources, gods, and in the high religions -- God. In order to explain how God originated, monotheistic religions necessarily conclude that God is the ultimate uncaused cause of all things. This is the only manner in which we can satisfy the causal operator which forces us to pose the question as to why God exists. In fact, we might suggest that the causal operator is crucial to our understanding of the concept of God. For if we search hard enough for causes, we eventually work our way back to some first cause which appears not to be caused by anything else. It is this first, and ultimate cause that many religions call God. This conclusion alleviates our urge generated by the

necessary functioning of the causal operator. Another way of exploring this issue is to consider what our conception of God might be like if we were to have a totally different brain that did not have the ability to conceive of God. What would our interpretation of God be like in that scenario? God would likely not be attributed to the fundamental cause of all things. Perhaps God would be perceived to represent universal love or forgiveness. Either way, of course, this would not alter whatever God's true nature would be, only our ability to express and understand it.

Clearly, I have oversimplified the explanation of how the brain and autonomic nervous system work. These topics are all considered in more detail in the book, but for the purposes of the discussion regarding the book, it is necessary to review some basic concepts. However, even within the basic functioning of the brain, we can see that there are functions that might be directly related to how we perceive religious experience. While we can begin to consider the implications for such an approach, we will explore more detailed models of brain activation during religious experience in the next installment.

Why God Won't Go Away: Brain Science and the Biology of Belief (Ballantine; ISBN 0-345-44033-1; Hardcover, 226 pp.; \$24.95; 2001) by Andrew Newberg, Eugene D'Aquili, and Vince Rause

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