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Reviewed by: Jürg Kesselring, Department of Neurology and Neurorehabilitation, Rehabilitation Centre, Taminaplatz 1 Valens, 7317 Switzerland
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Abstract
This very readable and erudite book on neurology and religion, edited and co-authored by well-known and very knowledgeable experts in theology and philosophy as well as in neuroscience and medicine. They take on the difficult task to try to explain religious experience and behaviour in neuroscientific terms to study correlations of neural phenomena with subjective experiences of spirituality and hypotheses to explain such phenomena. There probably is a neurological and evolutionary basis for subjective experiences traditionally categorized as spiritual or religious.

Keywords
Neurology, religion, humanities

Studying people with neurological disorders, such as stroke, epilepsy, or Parkinson’s disease, can teach us a lot about brain mechanisms underlying religious beliefs and practices. In this innovative book, the interactions of social influences, religious upbringings and neurological disorders on lived religious experience are analyzed in a clinical case study approach in a number of different religions. The contributors to the book and experts in various academic fields ensure in an interdisciplinary way a variety of perspectives to help understand how religious life may be affected when different cognitive functions are impaired due to neurological disorders and how faith might modify their effects and how awareness of faith practices may assist in the treatment of such conditions and in the rehabilitation of their consequences.

The editors of this book are Alasdair Coles, who is both a well-known professor of Clinical Immunology and Consultant Neurologist at Cambridge University and an ordained priest in the Diocese of Ely, Church of England; and Rev Canon Dr Joanna Collicutt, the Karl Jaspers lecturer in psychology and spirituality at Ripon College, Cuddesdon, an associate priest in a west Oxfordshire parish, and an honorary canon of Christ Church Cathedral. She was the head of the Oxfordshire neuropsychological rehabilitation service for many years. They bring together co-authors from various fields, for example, clinical psychiatry, clinical neuroscience, philosophy, physiology, behavioral sciences, general practice, neuropsychology, and speech-language pathology. The borderland between religion and neuroscience is fertilized from both sides, never falling into the trap of reductionism.

A fitting narrative with which to start in looking for neurological links to religious experience is a type of epileptic seizure, which is called ‘Dostoevsky’s seizure’. In Dostoevsky’s novel ‘The Idiot’, the central character, Prince Myshkin, has epileptic seizures: just before the actual convulsion: suddenly, ‘Prince Myshkin’s brain seems to catch fire... all his doubt and worries composed in a twinkling, culminating in a great calm, full of sense and harmonious joy and hope and a blinding inner light flooded his soul’. Dostoevsky was able to write so beautifully about these episodes because he himself experienced such events. He says later on in an autobiography: ‘You have no idea, you who do not have epilepsy, what joy we epileptics experience just before a seizure’. This experience began to be investigated by the great Canadian neurosurgeon Wilder Penfield several decades ago. He operated on awake patients and stimulated their cerebral hemispheres, trying to work out how far he might resect parts of the brain...
without causing too much damage. When he stimulated a certain part of the brain, the awake patient in the operating theatre would say: ‘I feel as though a light has come into the room’ or ‘I feel a sense of calm. I feel there is someone here who cares about me, who loves me’, some people went on to say that they felt that God, Mary, or some other figure was present. But when electricity was turned off, this feeling and impression ceased immediately. This has been documented time and time again. The particular part of the brain, where these ‘numinous’ feelings can be produced by stimulation, is the temporal lobe.

This new book deals in depth and in a very erudite manner with empirical research at the interface between knowledge and faith, topics which have been taken together in recent years under the heading of ‘Neurotheology’. Nietzsche describes humans as ‘hopelessly religious’ and CG Jung stated that the human soul is ‘naturaliter religiosa’. Indeed, the vast majority of the earth’s population is in some way religious. The militant atheist Richard Dawkins blames indoctrination by parents and other educators for this. Without denying the importance of tradition, this book looks for the foundations of religiosity in the sense of a brain function capable of learning.

‘Religion’ is a broad and extremely multifaceted concept. A shortened lexicon definition expresses roughly the following: ‘From spiritual–emotional turning towards the last reason for being, manifold human response to the experience of a powerful supernatural existence’.

It has always been clear, however, that a distinction is needed between religion as a culturally created belief system with its manifold contents, and religiosity, the basic belief of the human psyche. Only the latter can be the subject of scientific investigations, especially since today, there are various findings, which suggest that the belief function is an evolutionarily developed peculiarity of the human brain. From the multitude of clinical and experimental findings, there are several important ones in connection with religious experience. Ramachandran, a neuroscientist, started from the fact that patients with temporal lobe epilepsy often have a heightened religious sensibility, and so, he compared them to healthy subjects in a test, both groups on one monitor, in which words with neutral, sexual, or religious content were offered. On the basis of fluctuations in skin conductivity, he then determined the responsiveness of the test persons to these stimulus words. Therefore, he demonstrated that healthy individuals showed the most violent reactions to sexual words, while people with epilepsy responded more intensely to religious words. Using positron emission tomography, Ramachandran tried to determine the location of the highest level of hyperactivation in religious emotive words in the temporal lobe. This then went on to become the ‘God spot’ in the lay press.

The SPECT experiments of Newberg et al. also attracted much interest. These authors, a radiologist and a psychiatrist, set the question of whether spiritual experiences such as trance and meditation produce similar patterns of brain activity. Their research subjects were Buddhist monks and Christian nuns. It became apparent that regardless of the creed, completely similar shifts in activity took place: circulation and oxygen consumption were drastically reduced in the upper posterior parietal lobe. This region is known to provide a field of orientation that locates the individual in space and time and that a reduction in function is associated with an experience of exstasis is quite compatible. Besides that, frontal brain activity was markedly increased, fitting well to the highly concentrated meditative state, since this region is, among other things, concerned with attention control.

Most interestingly, but not without controversy, became associated with the work of the Canadian neurologist Michael Persinger. He used transcranial magnetic stimulation by means of a motorcycle helmet with eight magnetic coils, through which circumscribed brain areas were stimulated. About 80% of the test persons described mystical experiences: either they experienced the presence of God, of a guardian angel, or if they were atheists, a kind of unio mystica with the Universe. In Persinger’s view, the ‘God module’ had been detected. However, his results in similar test settings were not replicated easily. Granqvist et al. also worked with the ‘God’s helmet’ but set it at reduced power in half of the control group. It turned out that a proportion of the sham-stimulated subjects reported similar mystical experiences, which, of course, raised the question of a placebo effect. However, Granqvist also had to accept criticism of his methodical approach.

From another side, it was also pointed out that with such experiences, not only the temporal ‘God spot’ becomes active but an entire neural network, which also includes frontal and occipital areas (visual cortex). In addition, clinical investigations on Parkinson’s patients who have frontal dopamine deficiency showed reduced religiosity in contrast to schizophrenics, whose frontal dopaminergic neurotransmission is hyperactive and who often suffer from extreme religious delusions. This is described in detail by Roger Barker, in chapter 10 of this book: ‘Parkinson’s disease, religious belief and spirituality’.

The findings described in this book, so well and carefully balanced, provide evidence that religiosity is closely related to the human brain. Yet, these results should not be overinterpreted. Assuming a precise localization of religious belief in a narrowly defined brain area would be to go too far. At present, the limits of knowledge are still too narrow, and the consistency of the findings in these clinical experiments is too limited.

It seems legitimate, however, to raise the question of how mankind, in the course of its history of development, was able to acquire this capacity for religiousness, which is unique in nature, and why this happened. These issues address evolutionary explanatory models that are used in psychology and psychiatry in which they play an
increasingly important role. Ultimately, the question is whether and to what extent religiousness in the broadest sense could have represented a survival advantage in the course of hominid evolution. As Voland aptly points out that at least three criteria would have to be met to serve as an indication of evolutionary adaptation: faith should be hereditary; it must be the product of a historical selection process, that is, have a purpose-oriented design, and it would have to solve a problem of adaptation for the species concerned.

Central elements of religiousness do meet these criteria, for example, the ability to attain different states of consciousness, but also bonding, that is, the promoting effects on group formation as well as communication, thus, also personal identity formation, which has always been essentially determined by group membership.

It must be emphasized, however, that neither the forms of belief (single or multi-God belief) nor dogmas, picture canons with saints, angels and demons, let alone rituals and sacraments are seen as evolutionary adaptations in the Darwinian sense. These phenomena are cultural creations of human consciousness, which, however, has made a number of evolutionary adjustments of cognitive structures. As far as the adaptation characteristics in detail are concerned, it can be stated today that the three points mentioned above are largely empirically confirmed in their actuality. Thus, individual studies indicate that the fundamental willingness to believe religious content, are co-determined at least by genetic factors, as has been proven for other essential traits, such as intelligence, narcissism, dissociality or neuroticism.

The functional adaptation value of religiosity, on the other hand, is expressed above all in the context of large group formation. Common beliefs, which are coupled with various rituals, enable better coordination and cooperation (cf. commandments and prohibitions) among the members, which give these associations a competitive advantage. Thus, religiously enhanced identity formation and solidarity provide stability and expansion of these groups. Finally, religiosity, in combination with the religions based on it, contributes to the human ability developed in evolution, namely from restrained use of deception and fraud, since each religion also provides a selection of ‘Honesty signals’: oaths, vows, marriage ceremonies, and so on.

The omniscient, metaphysical entities have also served the function of monitoring the hidden activities of the faithful and, if necessary, inflicting punishment, thereby ensuring a strict control of standards. Roes and Raymond proved that the belief in a punishing God is increasing with the size (and thus complexity) of a population. From this, it can be seen that, at least under original living conditions, the affiliation of an individual to a religious group improved chances of survival and reproductive prospects. From the point of view of the group, this sociocultural determined cohesion enhanced the possibility of numerical growth. Based on the social cognitive abilities or brain size of the individual human, group size would, according to the Dunbar number, remain limited to about 150 members. Thus, the (tribal) religions created a social cement, which has led to a significant increase in social associations. This might have led to superiority of appropriately equipped communities over smaller groups that were thereby successfully displaced or subdued (group selection).

Successful religions were therefore those which were capable of winning a majority in terms of their beliefs, that is, by offering a common spiritual denominator and uniting the largest possible number of followers under their banner. These findings remain provisional and should be interpreted with due caution. While the contents of faith are cultural creations that have undergone their own development in every community, the elementary faith is an evolutionary force that reflects an inherent ability of the human brain to socialize and be indoctrinated according to contemporary and cultural forces.

The present fashion is to dignify every topic with the prefix ‘neuro’. A book entitled ‘Neuroculture’ by the neuroscientist Rolls advertises its contents as neuroscience, neuroaffect, neurosociality, neuroreason, neurophilosophy, neuroaesthetics, neuroethics, neuropsychiatry, neuroreligion and neuropolitics. As the expression goes, everything hangs on a thread (= ‘neuron’), and hence, we now have ‘neurotheology’. As seen above and elaborated in much more detail in this well-referenced book, some empirical research demonstrates that the excitation of certain brain areas can lead to experiences that have been described over the centuries also without such stimulation (e.g. as religious experiences). The fact that they are caused by irritation is taken as an indication that they can, so to speak, be independent of the person, that is, not subjective, as the experiencing person thinks, but actually objective, for example, ‘only’ electrical stimulus patterns or logical sequence states of certain combinations of genes and molecules. The tragedy of such allegations is that categories are mixed, which should better be separated: Our own human experiences, to which most probably the religious ones also belong, are not sufficiently defined through individual molecular strengths of electrical current and images derived from magnetic resonance in an experimental setting. Experiences always have a history, which is lost in the measurement of individual ‘objective’ parameters. Does it surprise anyone that experiences are associated with brain function and that they too have emerged in the course of our development?

The basic question, which is probably also a question of faith is whether or not we experience ourselves in such a way that we can influence our ‘lively functions’, our functions of life, in a natural, personal and social environment (with or without awareness of these interventions); or whether we are passively at the mercy of brain activity determined by external agencies. ‘Genetically determined...’ does not simply mean ‘unchangeable’. By way of example, phenylketonuria, in which the genetic defect, the resulting enzyme deficiency and the disease pattern are all well known, shows that the consequence
of genetic determination can certainly be side-stepped if only the food component of phenylalanine is avoided and renounced. The crucial issue is to consider and investigate the interactions and steer these towards defined targets and goals. Many neuroartefacts arise from the fact that the relative ease of examining single, isolated brains, often those of laboratory animals, or computer simulations is dependent upon because these are technically easier to study. This limitation fails to address the ‘community of brains’, arising from interactions between living carriers of such brains each with its own history, in which natural and social environments is constantly being adapted. Here lurks again the danger of category errors, if from such artifact conclusions are drawn directly as to reality and truth, these then accommodated and adapted to somewhat artificial experimental conditions.

Certainly, it may be difficult to resist indoctrinations especially if they include the obligation not to allow oneself and other people to ask questions. But personal knowledge derives not only from parental influence, primary education, or religious instruction, each potentially subject to indoctrination, but also the modulations of friendship, literature, travel and cultural exposure, enabling further honing education. Weighing up the influences must always be carried out by the individual depending on his or her personal history and with regard to wishes and targets and goals. Such weighing of experience, the perception of contents and the possibilities of actions in context are certainly also brain functions.

The world is a book, and with freewill and ‘litteracy’, one can decide for oneself whether to spend a lifetime scrutinizing one page or reading on. Poetry and music heal the wounds that the world and the mind inflict. For a sense of wonder, one can always look at a flowerbed or step outside at night and look up at the sky. We are always looking for meaning: the brain provides the structure for this search but we will not illuminate the narrative of our experiences in life by dissecting the brain, no more than we will understand the meaning of a picture by analyzing the weight or the chemical composition of the colours used nor will we grasp the personal significance of an inherited armoire by deciphering its cellulose content. The mystery is implicit in the fate of those missing persons whose traces remain in the form of bones, which calls into question too strict an adherence to reductionism:

Because bones are – only at first sight: just bones, a rigid easel for possible pictures, buried by the wayside in unveiled pain, abandoned without caressing.

Skin & colour are decayed, gender, too, only exists as DNA – but form and shape: Human

For families and friends of missing persons the past is always part of the present. Even more: the unexplained absence makes them more present than ever.

In calcium phosphate or in collagen, in the osteoblasts and osteoclasts – or where exactly? – there is a story, a desperate and yet eloquent one, history of longing, fear & horror.

Views without eyes, Statements without words

And we have to recount them, dig them up, match them – to bring the bones into the clear air of life: the embraces that were in them and around them, the farewells, the kisses, the flowers to the right place in the wound, which can heal

Jürg Kesselring

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ORCID iD

Jürg Kesselring https://orcid.org/0000-0002-8645-7364

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