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Andrew Newberg's Model of Neurotheology: A Critical Overview

Introduction

It is commonly believed that the twentieth century was marked by the advance of science. Established in all its fields, primarily in the field of natural and technical sciences, the progress was evident in the field of research of human brain which included the sub disciplines such as: neurology, psychology, cognitive sciences (to mention just a few of the most prominent ones) as well as sub disciplines of each of these. Naturally, the topic of the human brain functioning has always embraced the studies of relations between human brain and one of the specific forms of human experience and the globally most widespread element of culture – religion. This resulted in having the research of this topic – the relation between the brain, its structure and activities, on one hand, and religion in all its manifestations on the other – becoming a specific and unique field of research with the attempts to evolve into an autonomous discipline. For the purpose of uniting two completely different sciences, a key word, a neologism, has been forged to name such a discipline – “neurotheology”.

The term neurotheology was first to be found in the paper¹ published in 1984 by James Ashbrook in the renowned journal *Zygon*. The main points of the paper were further elaborated in his book *The Human Mind and the Mind of God: Theological Promise in Brain Research*. Notwithstanding the fact that the use of the term has been accompanied by certain disclaimers² on the side of those who would opt for using it, the term has easily found its advocates and usage. Regarding its definition, however, there has not been any consensus yet nor has it been agreed on which approach to take in the research of the field referred to by the concept of neurotheology. For its inventor the term could refer to a form of natural theology of the brain whose task is to provide empirical evidence for the icon of God being inherent to man (in the sense of the ability to comprehend the transcendental), while for others the essential assumption of neurotheology is that an absolute being is a product and a function of human brain³. This should not

¹ James Ashbrook, “Neurotheology: the working brain and the work of theology”, *Zygon* 19:3 (1984) 331–350. On Ashbrook’s neurtheological investigations cf. Larry Greenfield, “Ashbrook as Neurotheologian”, *Zygon* 31:3 (1996) 457–462.

² Cf. James Ashbrook, *op.cit.* 331. Cf. Andrew Newberg, *Principles of Neurotheology*, Ashgate Publishing Ltd. 2010, ix. Basic reason why they still continue using the term, despite its shortcomings, is linguistic economy.

³ A product which gains concrete forms when interpreted in the framework of specific linguistic and cultural context. Cf. Michael Persinger et al., “NeuroTheology and its convergence with NeuroQuantology”, *NeuroQuantology* 8:4 (2010) 432–443, 432–443.

come as a surprise having in mind that a general consensus on the meaning or on the basic premises of theology has not been reached to date despite its millennial existence. Although conducted under a new name, the very topic of research is not so new. Namely, towards the end of the 19th century, a discipline titled “phrenology” appeared with pretenses to be scientific while attempting to establish the relation between human brain and religion. Just like neurotheology later on, phrenology also benefitted from the variety of approaches thus becoming attractive not only for Christian theologians but for deists and atheists as well.⁴

The research undertaken in the name of neurotheology can be generally classified with regards to the perception of neurotheology: whether it is perceived as part of neurology or of theology. The former sees it as being (1) a form of neuro-scientific research of religious phenomena, and the latter as (2) a theological reflection of the findings of neurosciences. Further subdivision can be done taking into account the premises of research in terms of their (A) reductionist or (B) integrative character.⁵ Combination of the stated divisions leads to the following classification of to date research in the field of neurotheology:

1A – the research that seeks to reduce theological phenomena down to the products of brain processes (normal or abnormal), which have or do not have their own evolutionary value. Mario Beauregard and Denyse O’Leary maintain that religious/spiritual/mystical experience represents an inherent part of human nature.⁶ Paul Bloom concludes, along similar lines, that “humans possess certain highly structured systems that have evolved for understanding the social world”.⁷ Michael Persinger, on the other hand, considers religious/mystical experience (understood as the foundation for formation of religiosity of an individual) to be a consequence of epileptic micro-seizures which occur in the temporal lobe and which are, albeit less not frequently, experienced by majority of people. These experiences, he holds, are interpreted within cognitive framework determined by the concept of God the result of which (interpretation) is religion.⁸ Given that these experiences occur in borderlands, i.e. in life-threatening situations thus enabling us to get liberated from fear, Persinger considers them to be evolutionary beneficial. Todd Murphy would agree that religion has its evolutionary value yet for com-

⁴ Wayne D. Norman and Malcolm A. Jeeves conclude that the phrenology failed as a science because it radically separated itself from its empirical basis, opening space for free speculations and interpretations. Cf. Wayne D. Norman, Malcolm A. Jeeves, “Neurotheology: Avoiding a Reinvented Phrenology”, *Perspectives on Science and Christian Faith* 62:4 (2010) 235–251, 246.

⁵ This scheme, representing a good overview, I borrow with small changes from Pierre-Yves Brandt, Fabrice Clément, Russell Re Manning, “Neurotheology: challenges and opportunities”, *Schweizerarchiv für Neurologie und Psychiatrie* 161: 8 (2010) 305–309, 305. Neurotheological investigations can of course be classified in another way, for example with regards to the part of the brain which is seen as an epicenter in which religious experiences occur – Cf. Michael Blume, “God in the Brain? How much can “Neurotheology” explain?” y: Becker, P. / Diwald, U. (Eds.), *Zukunftsperspektiven im theologisch-naturwissenschaftlichen Dialog*, Vandenhoeck & Ruprecht 2011, 306–314.

⁶ Cf. Mario Beauregard, Denyse O’Leary, *The Spiritual Brain: A Neuroscientist’s Case for the Existence of the Soul*, Harper One, 2007.

⁷ Cf. Paul Bloom, “Religious belief as an evolutionary accident”, in: Jeffrey Schloss, Michael Murray (Eds.), *The Believing Primate: scientific, philosophical, and theological reflections on the origin of religion*, Oxford University Press 2009, 118–127, 119.

⁸ Cf. Michael Persinger, *Neuropsychological bases of God beliefs*, New York: Praeger 1987; Michael Persinger, “The neuropsychiatry of paranormal experiences”, *Journal of Neuropsychiatry and Clinical Neurosciences* 13:4 (2001) 515–524.

pletely different reasons. He argues that the basic evolutionary unit is a group, not an individual. An individual capable of actualizing a neurological capacity for religious experience (which is common to everyone, he holds) provides a beneficial behavior for a group in a life-threatening situation since the individual offers a different perspective on the state of affairs and brings a new solution. In that way his/her actualized religious capacity is evolutionary beneficial since it helps the group to overcome danger.⁹ Richard Dawkins postulated a theory widely accepted by many (particularly evolutionary) scientists by which religion is considered to hold no evolutionary value, but represents a form of brain-virus (meme).¹⁰

1B – the research that seeks to determine the neurological basis of religious phenomena with no pretensions of presenting these as the consequences of brain activities. Along these lines, Eugene D'Aquili and Andrew Newberg hold that religious experience is an authentic neurological phenomenon and should not be considered (at least not until proved otherwise) a mere product of the brain activities.¹¹

2A – the research that, within apologetic framework, seeks to interpret the results of neurological studies of religious phenomena as empirical evidence of theological doctrines. In their coauthored book, James Ashbrook and Carol Rausch argue that neurological research proved man's inherent ability to know God.¹²

2B – the research that seeks to incorporate the results of neurological studies into the fundamentals of theology, at the same time allowing both neurology and theology to mutually correct their respective theoretical positions. D'Aquili and Newberg argue that experience (notably, the experience of "the unity of a being" – to be discussed below) is in the core of religious life. This experience, when interpreted by means of modern methods of neural sciences, should lead to conceptual change in theology.¹³

Present paper is concerned with Newberg's model of neurotheology with sporadic and *ad hoc* references to other forms of neurotheological research if need be. His initial research Newberg conducted and published together with the late Eugene D'Aquili. One of their first joint research was conducted in cooperation with the Buddhist monks and French nuns during their meditations and prayers respectively. This involved brain scanning (using fMRI method) and the results showed a unique neurological image of religious experience which led them to conclude that what they had in front of them was "the

⁹ Cf. Todd R. Murphy, "The Role of Religious and Mystic Experiences In Human Evolution: A Corollary Hypothesis for NeuroTheology", *Neuroquantology* 8:4 (2010), 495–508.

¹⁰ As such, religion has no value for the resistance of the human genome (as the basic unit of evolution), but rather is a form of replicator which, like the human genome, struggles to extend its own life (and not that of a human genome) through self-replication in the minds of the humans. Dawkins presented this theory in his famous book *The Selfish Gene* (Oxford University Press 1976) and later elaborated in the article "Viruses of the Mind" (1991) – Cf. <http://vserver1.cscs.lsa.umich.edu/~crshalizi/Dawkins/viruses-of-the-mind.html> [accessed on: 2/7/2013]. It is interesting, however, that one of the most famous proponents of this theory, Susan Blackmore, has completely abandoned it since she realized that the statistics goes completely against it, and proves religion to be evolutionary beneficial, encouraging reproduction – Cf. Susan Blackmore, "Why I no longer believe religion is a virus of the mind", <http://www.guardian.co.uk/commentisfree/belief/2010/sep/16/why-no-longer-believe-religion-virus-mind> [accessed on 2/7/2013].

¹¹ Cf. Eugene D'Aquili, Andrew Newberg, *The Mystical Mind: Probing the Biology of Religious Experience*, Fortress Press 1999.

¹² Cf. James Ashbrook, Carol Rausch, *The Humanizing Brain: Where Religion and Neuroscience Meet*, Cleveland: Pilgrim Press, 1997.

¹³ Eugene D'Aquili, Andrew Newberg, *Op.cit.*

photograph of God.”¹⁴ They elaborated on their findings in their most renowned work *The Mystical Mind: Probing the Biology of Religious Experience* (Fortress Press, 1999)¹⁵ which triggered numerous reactions, faced large amounts of criticism¹⁶ and launched a number of issues that are still being debated on within neurotheology. Some ten years later, Newberg published his book titled *Principles of Neurotheology* (Ashgate Publishing Ltd. 2010) in which he revised some of his earlier positions and postulated the basic principles of (any future) neurotheology so as to establish it as an autonomous scientific discipline. This book is yet to be given serious consideration by scientists (at least the amount of consideration given to the book *The Mystical Mind*) but it was noteworthy for a certain number of positive and negative reactions.¹⁷

The basic concepts contained in the book shall be presented in the paper outlining (1) Newberg’s definition of neurotheology, its basic assumptions and its subject matter; (2) the results of practical research it contains; (3) the results in theoretical research. An attempt will be made to present a brief overview of the positions taken by those criticizing Newberg’s model of neurotheology as well as the discipline *per se*, and to present the our own view of the subject.

1. Definition and basic tasks of neurotheology

Neurotheology is a scientific discipline that seeks to integrate knowledge and findings gathered by means of studies in religion, on one hand, and “neural sciences” on the other. Religion studies relate to the totality of religions, religious experience, but theology as well while neurosciences involve psychiatry, psychology, cognitive neurosciences, genetics, endocrinology and other sub disciplines that could fall into the category labeled by the term.¹⁸ As such, neurotheology is tasked with the following by Newberg: (1) to improve understanding of human mind and brain; (2) to improve understanding of religion and theology; (3) to improve human condition in terms of wellbeing and health of man; (4) to improve human condition in the context of religion and spirituality.¹⁹

Research topics should include: functioning of human brain²⁰, the relation between human brain, on one side, and mind and consciousness²¹ on the other as well as their connection with religious experience.²² Furthermore, theology should be allowed to benefit

¹⁴ Cf. *Op.cit.* as well as the chapter “Photograph of God?: An Introduction to the Biology of Belief” in Eugene D’Aquili, Andrew Newberg, Vince Rause, *Why God Won’t Go Away: Brain Science and the Biology of Belief*, Random House Publishing Group, 2002.

¹⁵ Besides that, Newberg and D’Aquili have published together many articles and a book entitled *Why God Won’t Go Away*.

¹⁶ For Newberg’s answer on some critical remarks cf. “Putting the Mystical Mind together”, *Zygon* 36:3 (2001) 501–507.

¹⁷ Tiffany Demke gives a very positive review of the book, comparing it to the Whitehead’s *Process and Reality* cf.

¹⁸ Tiffany Demke, “*Principles of Neurotheology*. By Andrew B. Newberg”, *Zygon* 46:3 (2011) 763–764. On the other hand, very negative review of the book is given by Deryck Sheriffs who mocks its content – cf. Deryck Sheriffs “*Principles of Neurotheology*. By Andrew B. Newberg”, *Evangelical Quarterly*, 84: 4 (2012) 377–378. A moderate approach is to be found in Jarvis Streeter’s review, “*Principles of Neurotheology*. By Andrew B. Newberg”, *Journal of American Academy of Religion* 80:3 (2012) 825–828.

¹⁸ Andrew Newberg, *Principles of Neurotheology*, 1; 45.

¹⁹ Cf. *Op.cit.* 18.

²⁰ Cf. *Op.cit.* 25–27, 74–75, 193–195.

²¹ Cf. *Op.cit.* 185–195.

²² Cf. e.g. *Op.cit.* 151–155.

from the latest neurological findings in order to better understand both humans and itself, considering the fact that it is a form of brain activity as well.²³ Neurotheology should seek to help people by exploring the ways in which religion and spiritual experience contribute to humans' wellbeing as well as to consider the practical implications thereof.²⁴ Above all, neurotheology should leave room for enriching itself with the results of neurological studies of religious experience in order to be able to contribute the improvement of the very experience by informing some of the religious practices about the methods that lead to achievement of the ultimate goal.²⁵

Thanks to its methodological approach to the studies of neurosciences and theology, neurotheology, Newberg claims, is entitled to postulate itself both as "metatheology" and "megatheology."²⁶ As *metatheology* it could provide for an approach which could explain all the essential features of theological systems and their structure. It should explain: (1) how and why fundamental theological doctrines are established; (2) how and why these doctrines evolve into complex logical systems; (3) how and why the doctrines, in their rudimentary and complex form, are expressed in religious rites.²⁷ As *megatheology* it should render universal theological content capable of encompassing any religious tradition and, at the same time, being accepted by it. For example, it is a common belief that certain Buddhist tenets, particularly those pertaining to meditation, are universal in their nature and can be easily accepted both by Christians and Jews. To that end, Newberg holds, neurotheology, being a science concerned with the things common to the whole mankind, i.e. religion and brain, should seek to construe theological contents that would be acceptable for any individual theological system (even for non-religious individuals).²⁸

Drawing from Ian Barbour's²⁹ model scheme of the relations between religion and science, Newberg argues that neurotheology should adhere to and encourage the model of *integration*. The very nature of neurotheology as a discipline implies integration of scientific and theological findings.³⁰ Such integration implies equal participation of these fields of human cognition. Hence, Newberg argues, the task of neurotheology is not (nor should it ever be) explaining religious and theological concepts from the scientific point of view, that is, in dissolving these phenomena into neurophysiologic processes. The other way round should not be the case either – to have neurological insights dissolved into theological tenets. On the contrary, integration should imply equal participation of both disciplines – theology and science – as well as unhindered and two-way flow of ideas between them with the ultimate goal being acquisition of as credible and comprehensive as possible insight into human brain, mind and conscience as well as into religious phenomena and theological concepts.³¹ Therefore, no causal priority should be set *a priori*

²³ Cf. *Op.cit.* 87–114.

²⁴ Cf. *Op.cit.* 200–210.

²⁵ Cf. *Op.cit.* 66.

²⁶ Cf. *Op.cit.* 39.

²⁷ Cf. *Op.cit.* 64.

²⁸ Cf. *Op.cit.* 65–66.

²⁹ I. Barbour presented four possible models of relationship between science and religion: (1) conflicts, (2) independence, (3) dialogue and (4) integration. Cf. Ian G. Barbour, *Religion in an Age of Science*, Harper and Row, New York 1990.

³⁰ Andrew Newberg, *Op.cit.* 51–54; 63.

³¹ *Op.cit.* 54.

of either material world or God, that is, in neurotheology position that *a priori* perceives religious phenomena as mere consequences of the brain activities should not be acceptable. Equally unacceptable it should deem the position that perceives the forms of brain activities involved in construction of religious experience as the consequence of a divine act. The integrating model also implies deployment of integrating method of research – the union of the methods inherent to theological research with those specific for neural-scientific research. This would leave room for exploring and establishing new methods of research that would better serve the needs of the goals and principles of neurotheology.³² To cap it all, neurotheology is obliged to remain open to all potential future findings even if these prove to be detrimental to the current position of theology or neural sciences.³³ Therefore, neurotheology must be ready to take on the role of the cause of paradigm shifts (in Kun's sense of the word), either in theology or in neurosciences.³⁴

Herewith we propose a two-level model for systematization of Newberg's research in neurotheology – *practical* and *theoretical*. The research within the former can further be subdivided into two groups with regards to the direction they take. One direction could be defined as going from religion towards neurology – it starts from religious, spiritual and mystical experiences³⁵ in order to observe the reflections these have on functioning of the human brain, neural system and the entire psychosomatic condition of an individual. The other direction goes from neurology towards theology – it examines the ways of induction and enhancement of religious experience by stimulation of certain neurological centers. With regards to theoretical level, the research can also take two directions. One direction starts from neurology towards theology (Newberg calls it “neurotheological hermeneutics”) and aims at showing the correlation between the brain centers and their activities, on one side, and formation of theological (theoretical) concepts, on the other. The other direction of research, from theology to neurology, seeks to enable theology to give its contribution to neural sciences by developing certain theoretical concepts (such as mind and conscience) or by assisting neural sciences, or better to say, science in general in finding answers to the questions concerning the nature of the world and the existence of the supernatural. Following Newberg, we shall focus on practical research of the first type presented here (direction: religion towards neurology) and on the theoretical research of the second type (direction: neurology towards religion). The fundamental theoretical principle which creates the framework for interpretation of the research results and which reflects the very nature of the concept of neurotheology whereby theology and neurology coexist as integrated equal disciplines is the principle of *correlation*. In line with this principle, religious and neurological phenomena are to be considered within the framework of their correlation, and not within the framework of causality.³⁶ Religious experience and theological concepts are not to be considered the consequences of neurophysiologic activities, nor are they to be perceived as the consequences of a divine act, at least not *a priori*. Should there be any causal priority established at any point, that principle can be adopted only *a posteriori*, that is, as an irrefutable research result.³⁷

³² *Op.cit.* 117.

³³ *Op.cit.* 55–60.

³⁴ *Op.cit.* 58–63.

³⁵ Newberg occasionally makes difference between these types of experiences, but usually treats them as synonyms.

³⁶ *Op.cit.* 154, 168.

³⁷ *Op.cit.* 55.

2. Practical level of neurological research

Central and perhaps the “most tangible” domain of neurotheological research is concerned with the research into the correlation between religious experiences and the overall psychophysical (primarily neurophysiologic) life of an individual. It is this particular form of research within neurotheology that has been conducted for the longest period of time and that has been most fruitful in terms of results. Focus of the research is placed on the changes man's neurophysiologic system undergoes during religious experience. Both subjective and objective reports on the experience are deemed equally crucial and significant.³⁸ Newberg distinguishes two mutually contradicting pairs of religious experiences: contemplative (e.g. meditation and prayer) and non-contemplative (linked with performance of rituals)³⁹; as well as active and passive experiences.⁴⁰

One way to examine how a spiritual experience is reflected in neurophysiologic activities is to monitor the activities of the autonomous neural system⁴¹. Another way is to monitor the changes in hormonal or immunological system that take place during a contemplative state.⁴² However, within practical neurological research, focus is placed on the brain activity. There are various methods to monitor brain activities and all of them have been deployed during neurological research of religious experience: EEG⁴³, PET⁴⁴, SPECT⁴⁵ and fMRI⁴⁶. The purpose these have in common is to monitor and measure changes in human brain caused by various brain activities, pharmacological substances or pathological conditions, and each of them has their advantages and shortcomings.⁴⁷ Various hypotheses have been tested in research conducted to date with regards to which part of the neural system is the centre of a spiritual experience.⁴⁸ Newberg's view is that there should be an integrated approach to the studies of human brain – the one that would not focus on isolating the centre of human neurophysiologic system which would be ascertained as “divine centre”, but the one that would be concerned with changes in the entire human neural system.⁴⁹

³⁸ *Op.cit.* 118.

³⁹ *Op.cit.* 159–163.

⁴⁰ *Op.cit.* 156–158. Therefore, it is possible to distinguish four basic types of religious experience: (1) active contemplative, (2) passive contemplative, (3) active non-contemplative and (4) passive non-contemplative experience.

⁴¹ Harold Koenig, Dana King, Verna B. Carson (eds.), *Handbook of Religion and Health*, Oxford University Press, New York 2001. It is an interesting fact that sometimes activity of both arms of autonomous nervous system has been detected – the sympathetic as well as the parasympathetic. Newberg refers to the research of C.K. Peng, J.E. Liu, Y., et al. “Exaggerated heart rate oscillations during two meditation techniques”, *International Journal of Cardiology* 70 (1999) 101–107.

⁴² For bibliography on the present issue cf. A. Newberg, *Op.cit.*, footnote 14, page 12.

⁴³ Electroenceelography measures electronic activity of the brain.

⁴⁴ Positron emission tomography – scans the state of the brain during its activity by tracing the presence of the radioactive tracers in the active brain regions. Tracers are injected during subject's activity (prayer, meditation), they become locked in active brain regions, and then subject is put in the scanner. Cf. *Op.cit.* 124–125.

⁴⁵ Single photon emission computed tomography – just like the PET scan, traces brain activity using radioactive tracers.

⁴⁶ Functional magnetic resonance imaging – measures changes in cerebral blood flow.

⁴⁷ *Op.cit.* 122–125.

⁴⁸ It is possible to differ four groups of neurophysiologic models, based on the emphasis given on the specific part of neural system which is seen as the “seat” of spiritual experiences: (1) temporal lobe, (2) frontal lobe, (3) autonomic nervous system, and (4) integrated model.

⁴⁹ *Op.cit.* 174–178.

Practical neurotheological research has been frequently concerned with a particular contemplative experience of active type – “unitary experience.”⁵⁰ According to Newberg, the unitary experience implies a mystical state, experienced during a prayer or meditation, in which a person becomes disoriented, feels the limits of the body and being blurring (or even disappearing) and experiences a complete unity with the totality of the whole existence (the common description of meditative experience) or with God (the praying experience) or with both.⁵¹ Such experience is usually accompanied by the feeling of tranquility and bliss.⁵² Some experiments showed that in the course of such experience the activity of parietal lobe was reduced.⁵³ Parietal lobe is involved in processing and integration of visual, hearing and sensory perceptions of a higher level. By integrating these perceptions it creates a three-dimensional image of the body thus providing us with the sense of direction and the feeling of the self.⁵⁴ Parietal lobe activity is closely linked with frontal lobe, which is involved in our voluntary activities as well as in formation of the “executive self” which determines our social behavior, plans our future actions and makes us capable of empathy. Limbic system, on the other hand, invests our feeling of self with the emotional value. Temporal lobe provides our self with the memory and enables us to think in abstract terms. As various experiments have shown, each of these centers has a role to play in unitary experience,⁵⁵ and it is believed that a study of the neurology of the unitary experience can prove useful in providing insight into both religious experience and the brain functions.

3. Theoretical level of neurotheological research

Apart from practical aspect of research which sets its focus on religious practice (contemplative and ritual experience and their neurological basis) neurotheology is concerned with theological research as well, hoping to establish the relation between theoretical (theological) thinking and the anatomy of brain activities. As it has been already said, Newberg holds that theology can be of much assistance to neural sciences in better understanding of their theoretical principles: definition of terms such as “consciousness” and “conscience”, the relation between the material (neurological) and the non-material (psychological and spiritual) in man, etc.⁵⁶ Nevertheless, what we shall deal with in this paper is the other direction of theoretical research in neurotheology – the research that seeks to contribute to theology from the neurological point of view by pointing at the neurological correlations within theoretical principles of theology. The sub discipline

⁵⁰ “Unitary experience”. In his earlier works (e.g. *The Mystical Mind*), Newberg uses another term to denote this experience: “absolute unitary being” (AUB).

⁵¹ *Op.cit.* 95–96, 152.

⁵² *Op.cit.* 152.

⁵³ *Op.cit.* 95.

⁵⁴ Some experiments have shown increased level of GABA molecules, produced by thalamus which block the flow of information coming from sensory perception (C. Streeter, et. al, “Yoga asana sessions increase brain GABA levels: a pilot study”, *Journal of Alternative and Complementary Medicine* 13 (2007) 419–426). Therefore, this blocking is considered to represent one of the neurological components of which the unitary experience is consisted.

⁵⁵ Patrick McNamara holds that exactly this point of religious experience is the focal point of the dialogue between neurobiology and theology. Cf. Patrick McNamara, *The Neuroscience of Religious Experience*, Cambridge University Press, 2009.

⁵⁶ Cf. *Op.cit.* 185–195.

concerned with this subject is “neurotheological hermeneutics” – it is concerned with examining “how brain affects theological and/or religious ideas”, to quote Newberg.⁵⁷

Newberg's research hypothesis is that a person forms his/her theoretical system on the grounds of *experience* that usually takes the form of “an ideological burst” or “a flash of insight” whereby some of the cognitive functions (pertaining to the respective part of brain) come into play. He states six key cognitive functions⁵⁸: (1) abstract thinking,⁵⁹ (2) integrated and fragmented thinking,⁶⁰ (3) quantitative thinking,⁶¹ (4) causal thinking,⁶² (5) thinking in binary oppositions,⁶³ and emotionality.⁶⁴

Newberg argues that each of the stated functions can be understood as a neurological correlate of certain theoretical (theological or philosophical) assumptions or principles.⁶⁵ Should any of the functions become prominent by taking on either *total* or *absolute* function, it immediately becomes the basic principle of person's theoretical point of view.⁶⁶ In the first case, that is, when the function operates in the *total* manner, the world is perceived, valued and interpreted through the prism of the given function. In the case of the function operating in the *absolute* manner, the concepts it creates are experienced as the basis, the founding principle, and the substratum of the whole existence. Let us use the example of the quantitative function processes to point out the difference be-

⁵⁷ *Op.cit.* 87. Generally speaking, Newberg's attempt to postulate principles of (any future) neurotheology goes along three paths of investigations:

1. *real* (investigations already taken whose results are interpreted),
2. *hypothetic* (investigations which, based on the current results of neural sciences, try to interpret theological theory and point to the possible relation between the two,
3. *potential* (investigations which deal with the neurological basis of moral decisions and the possible influence of religion on them.

In the following chapter, we deal with the hypothetical investigations.

⁵⁸ Depending on the topic discussed, the number of cognitive functions varies. Cf. *Op.cit.* 73–80, 94–109, 211–214, 226–231. Newberg treats “brain functions” and “cognitive functions” as synonyms.

⁵⁹ Includes the capacity for speech, investigation, logic, categorization of objects etc. One of the key roles of this function is production of general concepts out of larger group of objects and classification, which enables speech. These processes are closely tied to the parts of the temporal as well as the parietal lobe.

⁶⁰ The brain is capable of taking holistic approach in which different objects are contextualized and seen as a part of the whole. It is also capable of doing the opposite, taking the reductionist stand, fragmenting objects by means of analysis. Major part in this process is played by parietal lobe.

⁶¹ By means of which brain abstracts and processes the number of perceived things and develops mathematical concepts. The seat of these processes is the lower parietal lobe.

⁶² In this way, brain perceives and constructs causal relations between things and provides us with the possibility to plan our behaviour in the surrounding environment. This function, as well as the others, is of great importance for survival. The seat of this functions is probably in the lower part of the parietal and the upper part of the temporal lobe.

⁶³ It enables us to arrange abstract elements into dyads. This function is associated with the left part of the lower parietal lobe. According to Newberg, this is one of the most important ways in which our picture of the surrounding reality is formed, in which each part of the dyad is given meaning through the other one.

⁶⁴ The brain creates emotions by means of the limbic system. Besides giving the emotional value to all of our perceptions, the systems ties emotions to the advanced brain functions, so it is possible for us to interpret our experiences in the emotional sense, and determine our future action. Emotions fundamentally shape our consciousness to the extent that it is possible that some perception or thought never reaches our consciousness if they don't possess any emotional value.

⁶⁵ He provides a large number of examples tying almost every important philosophical or theological figure throughout the history to some of the above mentioned cognitive functions. Cf. *Op.cit.* 94–109.

⁶⁶ Although there are no proofs that this happens, there are some hints that it is possible for a significant percentage of information to be filtered through certain cognitive process. Cf. Taylor Bolte, *My Stroke of Insight*, New York 2009.

tween the two: in the course of total functioning of the process, the world would be perceived through the prism of mathematics, whereby mathematics would be experienced as the means to explain the existing world; in the course of absolute functioning of the process, the essence of the world would be experienced as a number.⁶⁷ In the light of this example, Newberg views Pythagoras' philosophy as a form of the total, even absolute, functioning of quantitative cognitive processes.⁶⁸ Newberg holds that intensive thinking within certain theoretical framework, which corresponds with respective cognitive functions, can result in an enlightening experience wherein the particular function is experienced as total or absolute. Following this "flash of insight" a person constructs his/her theoretical system dominated by the position pertinent to the respective cognitive function, with firm belief that it (the position) represents the very reality.⁶⁹

But what is the purpose of these insights? Newberg thinks that theology can benefit from the knowledge about the effect the very "brain architecture" has on formation of complex theoretical structures. He argues that it is these insights that follow Kant's line of thought on the a priori categories of reason (in this particular case, the categories are represented by the very physiological structure of brain) as well as Husserl's phenomenology of subjective experience. Once we comprehend the "organic", that is, neurophysiologic principles of thinking, we may find it easier to adjust an idea or a theory to the way brain functions thus making it more understandable, more acceptable, or, at least, to be able to understand better why the proponent of a theory believes in its credibility. For example, we may better understand why we find it hard to comprehend and accept the Christian doctrine on the Holy Trinity. Given that formulation of this doctrine involves both holistic and reductionist processes (God is both one and three), their conflict makes it difficult to be accepted by the brain. However, it is precisely this conflict of contradictory functions that can have positive outcome – a strong feeling of awe and fear in front of the mystery.⁷⁰ Likewise, insights into the brain functions from the neurological perspective can prove beneficial for another autonomous discipline – neuroethics.⁷¹ At the end of the day, the goal is to be able to get a whole picture of man, which would incorporate knowledge of man's "spirit" and "body".

Newberg's argument, therefore, is that there is a correlation between the brain, or more precisely, its structure which includes various cognitive centers, and the way we see and contemplate the world we live in. Depending on which of the centers comes into play, that is, which centre takes over the function of (absolute or total) "filter" through which we see the world, our worldview is formed and dominated by the perception generated by the center. With regards to specific concepts, let us reiterate that if their apprehension implies activation of mutually opposing cognitive functions, their reception will prove more complicated.

⁶⁷ *Op.cit.* 89–90.

⁶⁸ *Op.cit.* 104. He provides examples of great philosophers whose system of thought can be seen as a consequence of total or absolute functioning of a certain cognitive function. Cf. *Op.cit.* 91–105.

⁶⁹ *Op.cit.* 224–225.

⁷⁰ *Op.cit.* 226.

⁷¹ Cf. *Op.cit.* 210–214.

4. Critique of (Newberg's) neurotheology

Perhaps the most mundane objection to one of the first and most relevant discoveries of neurotheology presented by Newberg and D'Aquili – the fact that religious experience can be traced in brain structure by means of scanning procedure – has been: “so what?” For the critics the discovery is a mere truism and deserves no attention nor is it worthy of any research whatsoever.⁷² The objection, which does appear sensible, targets Newberg's first proudly presented research results which showed that “mystical experience is biologically, perceptibly and scientifically real.”⁷³ However, this objection has failed to be credible in denying neurotheology its disciplinary nature for the simple reason that the claim has never been stated as the ultimate goal of neurotheology, at least not in Newberg's later works.⁷⁴ On top of that, Newberg leaves room for future research to prove the opposite, i.e., that religious experience cannot be traced neurologically, which he would find interesting to be studied.⁷⁵

Notwithstanding the value of truism attributed to the claim that religious experience is neurologically real, the same cannot be claimed when distinguishing religious experience as a specific form of a neurological event. In the light of the fact that religious experience lies in the core of neurotheological research, its conceptual dissolution would, apparently, bring the very foundations of neurotheology into question. Along those lines comes harsh criticism from the side of Matthew Ratcliffe.⁷⁶ He questions the very definition of religious experience and wonders what the common denominator would there be for its varieties, thanks to which they form an autonomous category of experience. The fact that a person undergoing an experience recognizes it as religious, neurologically real, does not mean that it represents a particular form of a neurological experience. Ratcliffe argues that in order to establish itself as an autonomous discipline, neurotheology must clearly define one and unique category of religious experience. He refutes the possibility of existence for such specific category of neurological experience, as much as he refutes the possibility of existence for a neurological category of experience of a cat.⁷⁷ According to Ratcliffe, religious experience does not exist as a specific neurological phenomenon, but is recognized as such in the course of *interpretation* (both on the side of the experience and the researcher) which itself is vested with the traits of the language and the socio-cultural context.⁷⁸ Therefore, if religious experience cannot

⁷² Cf. Michael Marsh, *Out-of-Body and Near-Death Experiences: Brain-State Phenomena or Glimpses of Immortality?*, Oxford University Press, 2010, 237-241; Nancey Murphy, *Bodies and Souls or Spirited Bodies?*, Cambridge University Press, 2006, 67-68.

⁷³ A. Newberg, E. D'Aquili, *Why God won't go Away?*, chapter „A photograph of God?“.

⁷⁴ It has been already noted that Newberg makes statements in *The Principles of Neurotheology* with greater care. Evolution in his ideas is acknowledged by himself as well – Andrew Newberg, “Putting the mystical mind together”, 502.

⁷⁵ A. Newberg, *Principles of Neurotheology*, 120.

⁷⁶ Matthew Ratcliffe, “Neurotheology: A Science of What?”, in: Patrick McNamara (Ed.), *Where God and Science Meet: How Brain and Evolutionary Studies Alter Our Understanding of Religion*, Vol. 2, Praegers Publishers, 2006, 81–104.

⁷⁷ Cp. *Op.cit.* 88. Similar illustration, although without reference to M. Ratcliffe's work, is provided by Friedrich Wilhelm Graf, “God's Brain. Some Critical Remarks on Modern Neurotheology”, *European Review* 15 (2007) 257–264.

⁷⁸ Ratcliffe argues that we cannot perceive the no-smoking sign without conceiving its meaning, which is provided by the language that we speak and the culture that we share. Cf. *Op.cit.* 84–85. Norman and Jeeves would say that religious experiences cannot be reduced to affective events, because they

be distinguished on the basis of the type of object which is experienced, then it has to be assumed that it is a specific *form* or *manner* of experience. If the experience studied by neurotheology is defined by its object (God, and not, for example, a cat) then it remains unclear why such type of experience would deserve to be studied in its own right. On the other hand, if this experience is defined by the way an object gets experienced, then a question should be posed: how is it possible to put them into one category without referring to their object?⁷⁹ As a result, Ratcliffe holds, neurotheology ends up in a limbo. Due to the non-sustainability of the concept of religious experience as an autonomous category, Ratcliffe denies neurotheology its disciplinary independence.⁸⁰ W. Norman and M. Jeeves tend to agree with him and claim that even if we accept the fact that religious experience does exist, the form of this experience studied by Newberg is so extraordinary and unusual that it could apply to a very small percentage of the forms of religious experiences in general. Hence the conclusion that to study such a form of religious experience would be irrelevant for any claim on religious experiences in general.⁸¹ Ratcliffe argues along similar lines – “the unitary experience” cannot be the common denominator of all religious experiences so as to provide room for its categorization because it would do injustice to the variety of experiences and their complex mutual relations.

Such criticism appears to be convincing and jeopardizes the very foundation of neurotheology – religious experience *per se*. However, the (assumed) proposition that religious experience does not exist as such in neurological terms should not leave the studies of the relation between religious and neurological phenomena void of reason or coherence. It appears that it is a matter of convention and cost-effectiveness whether such research is to be conducted within one scientific discipline. The very subject of the relation between human brain and religious phenomena appears to be wide enough for an interdisciplinary approach.

Even if we are ready to accept the stand that religious experience exists as a distinctive neurological phenomenon and that it can be the object of a study, the question remains – does it “create” religion? In other words, does religious experience dominate religious life to that extent that it deserves to be studied hoping that the results would explain the most relevant structures of religious systems? As a science primarily concerned with religious experiences and their neurological correlations, is neurotheology indeed entitled to take on the role of mega-theology and meta-theology, as Newberg describes it? The answer of the critics of neurotheology would be – no! Their argument is that religion *is not based* primarily on experience. Religion, P.Y.Brandt and others claim, represents a complex system that takes shape “not only through subjective interpretation but also through the interaction between individual brain and mind activity and linguistic elaborations based on highly complex cultural symbolic systems”.⁸² Therefore, the study of religion, including its neurological basis, must incorporate the studies of

represent a cognitive event which includes reflective evaluation of thoughts. Cf. W. Norman, M. Jeeves, “Neurotheology: Avoiding a Reinvented Phrenology”, 244.

⁷⁹ *Op.cit.* 88–89.

⁸⁰ He proposes, instead, that attention should be given to the neurological investigation of emotions, since they can contribute to better understanding of religious phenomena – Cf. *Op.cit.* 100–102. For the same reasons, the term “neurotheology” is considered to be unjustifiable by Michael Marsh, *Op.cit.* 237–241.

⁸¹ Cf. W. Norman, M. Jeeves, *Op.cit.* 245–246.

⁸² P-Y.Brandt et al., *Op.cit.* 309.

other disciplines: psychology, evolutionary biology, cultural anthropology, philosophy, etc.⁸³ Moreover, some argue that it is precisely some of these disciplines or a new synthesis of scientific disciplines (e.g. evolutionary theology) that can take on the role of a true meta/mega-theology.⁸⁴ Such an objection appears to be not too much in contradiction with Newberg's concept, at least not with the one he claims to argue for, having in mind that, on occasions, he insists on integration of a number of scientific disciplines.⁸⁵ Admittedly, he insists that this integration should take place under the roof of neurotheology whose focus he places on the neurological basis of religious phenomena. On the other hand, this objection seems legitimate considering the fact that he places religious experience at the centre of his neurotheological model. Experience is essential not only in the field of practical but theoretical research as well. As we have seen, he holds that a person defines his/her theoretical principles specific type of experience, i.e. "flash of insight". Indeed, Newberg appears to presuppose the existence of a concept of neurological experience in its objective, pre-interpretative form. In this light, the criticism above seems to be justified to a certain extent.

Opinions are divided with regards to the capacity of neurotheology to provide an information on the existence of the object of religious experience – whether it can prove or disprove the existence of God. As discussed above, Newberg takes a cautious approach to this topic and insists on the concept of correlation. Neurological phenomena must not (at least not *a priori*) be perceived as the causes of God's existence or as caused by Him. Many have voiced skepticism when it comes to neurotheology ever being able to say anything relevant concerning the "object" of religious experiences. They say that studies of the brain will not take us anywhere else outside the brain itself.⁸⁶ Even if it gets proved – and some⁸⁷ claim that it already has been the case – that there is a direct link (even of causal nature) between neuropathological condition and religious experience – say, that the apostle Paul suffered a brain stroke on his way to Damascus – Malcolm Jeeves sees in it no epistemological value for the issue of truthfulness of what apostle Paul preached later.⁸⁸ Completely opposite position is taken by those that adhere to reductionist principles and who explain religion as a product of either normal or pathological brain functioning.⁸⁹ Somewhere in between are those who argue that although, for the time being, neurotheology (or some other related discipline) is not capable of doing it, in principle it is possible to completely refute God's existence. Such position is shared by Newberg and M. Ratcliffe. The latter holds that if it could be proved beyond doubt that religious experience represents a consequence of a pathological condition of

⁸³ Cf. M. Ratcliffe, *Op.cit.* 100–102.

⁸⁴ Cf. Karl E. Peters, "Neurotheology and evolutionary theology: Reflections on *The Mystical Mind*", *Zygon* 36:3 (2001) 493–500, 496.

⁸⁵ Cf. e.g. Andrew Newberg, "Putting the mystical mind together", 506.

⁸⁶ F.W. Graf, *Op.cit.* 260. The same position is taken by N. Murphy, *Bodies and Souls or Spirited Bodies?*, 67–68; as well as Kevin S. Seybold, *Explorations in Neuroscience, Psychology and Religion*, Ashgate Publishing Ltd. 2007, 80–86.

⁸⁷ Jeeves Malcolm, "Brain, Mind and Behaviour", in: Warren Brown, Nancey Murphy, Malony Newton (Eds.) *Op.cit.* 92.

⁸⁸ Various forms of reductionist arguments which seek to disprove theism are analyzed by Justin L. Barret, "Is the Spell Really Broken? Bio-psychological Explanations of Religion and Theistic Belief", *Theology and Science* 5:1 (2007), 57–72.

⁸⁹ Cf. M. Ratcliffe, *Op.cit.* 97.

the brain, or that religion is an evolutionary useful byproduct of the brain, this should result in our discarding of religious beliefs as completely unfounded.⁹⁰ However, neither of the arguments appears to be valid. For example, if one could prove that, as a result of brain malfunctioning, a person can hear sounds beyond the frequency a normal person would hear, this would not prove that those sounds are not real. Likewise, if one could prove – albeit in evolutionary theories one is reluctant to use the word ‘prove’ – that religion is useful in evolutionary terms, this would still say nothing about the truthfulness of the faith in God. On the contrary, those inclined to accept the theory of evolution and the faith in God could conclude that it was the faith in God that made us human.

Concluding remarks

In addition to the above stated objections to Newberg’s model of neurotheology herewith we add our own concerning: (1) the concept of theology within neurotheology; 2) the focus on religious experience; (3) the integration of theology and neurotheology.

1. First of all, the word “theology” as part of the neologism “neurotheology” is void of its referent. Although there (can and should) be only one neurology, and not say a Buddhist or Islamic neurology, there (cannot and should not) be only one universal theology. The proof that this is not merely about language economy is evident in Newberg’s aspiration to postulate meta-theology and mega-theology. From the point of view of Christian theology, it appears rather impossible to construct a “theology” that would be of a general, super-religious nature aspiring to explain and level out the differences among the theologies of individual religions and to prescribe their respective course of action. Such aspiration could find its place within a form of neurologically oriented religious studies, not within theology.⁹¹ Such an attempt would be considered utterly wrong from the perspective of Christian theology in particular having in mind the hints Newberg voices regarding the directions that might be taken so as to level out differences among religious systems. Namely, he suggests the beneficial role of neurotheology in helping us understand that (some yet not all) differences among religious doctrines are actually not contradictions. On the contrary, the fact that we perceive them as mutually exclusive can be attributed to the specificity of the brain structure but not to the doctrines per se.⁹² However, I would argue that insight into the brain functions could perhaps enable us to understand that the contradiction between the statements “God is one” and “God is Trinity”, or between “Christ is God” and “Christ is man” is just illusory. The fact that contradiction is illusory can be demonstrated by logic as well, yet neurotheology gives an explanation *why we see it as a contradiction*. However, neurotheology *is not* able to show us that the contradiction between the statements “Christ is God” and “Christ is not God”, or between “God is Trinity” and “God is not Trinity” is just illusory – because it simply is not, the contradiction is real. With regards to “differences among the doctrines” – at least the fundamental ones which distinguish different religions (and

⁹⁰ It seems that he is suggesting the opposite: „Certain theists and atheists alike have argued that well-formed beliefs just are those that are generated by properly functioning cognitive apparatus operating in normal environmental conditions“ (M. Ratcliff, *Op.cit.* 97).

⁹¹ A thing well suggested by F.W.Graf B. F.W.Graf, *Op.cit.* 260.

⁹² By considering the nature of exclusivity, neurotheology may provide some direction as to how different doctrines might be considered to coexist. Further, knowledge of the neurophysiologic necessity for exclusivity may help our overall understanding of the conflicting nature of religions.” – A. Newberg, *Op.cit.* 227.

not denominations) – which neurotheology is expected to overcome, we are dealing precisely with statements like these. To cap it all, as there is no such thing as universal “theology”, there should not be any universal “neurotheology”.

Consequently, “neurotheology”, I would argue, could exist in two forms: either (1) as a component of theology, or (2) as a component of neurology. I argue that in the first case, as a theological discipline, it could have its proper place and justify its name⁹³ whereby its task would be to enter a dialogue with contemporary neural sciences without aspiring to construe a universal theology which would level out differences among doctrines so as to become acceptable to all of them. In this case Christians could have their own neurotheology, Buddhists their own, just like these have their respective “theologies”. In the second case, as a component of neurology, “neurotheology” could keep its name for the sake of language economy, but with a disclaimer that would indicate considerable distortion of the meaning of the word “theology”. As such, neurotheology would be concerned with neurological aspects of religious phenomena seeking to ensure insights that would be beneficial for, primarily, neurology but for religious studies as well.

2. The fact that Newberg sees a *concrete neurological experience* as the very centre of any religious phenomenon (a prayer, a doctrine...) appears to be rather problematic. We have already discussed the impossibility of considering religious experience as a category of neurological experience as well as the impossibility of explaining the concept of religion in its totality by means of the analysis of neurological processes. However, the field within which the perception of an experience as the central point is problematic is neurotheological hermeneutics. As already stated, Newberg argues that the centre of every theory is occupied by certain experience which determines the respective theory. The direction any research in the field of hermeneutics might take following this position would open room for free speculations. Following the logic of such speculations one could test Newberg's thesis within his own teaching. One conclusion could be that the very neurotheological claims on a neurological experience being in the basis of a theory are the result of a total or absolute functioning of a certain cognitive function – say, the centre for causality. In the pursuit of the *cause* of theoretical positions in the total or absolute functioning of a cognitive function, one is to conclude that such pursuit is a consequence of domination of the causal cognitive function. One might add that an emotional function gets suspended given that any research, therefore scientific as well, is to be conducted in an objective, depersonalized fashion. Consequently, it seems to me that “the research” conducted this way is nothing else but a pure speculation. Likewise, the assumption that a theory is formulated as a result of domination of a specific cognitive function in one's brain appears to be rather bold. By postulating this stand, I would add, Newberg adopts a specific type of reductionism that he elsewhere attempts to avoid by advocating the principle of correlation. In a nutshell, the most complex theories are reduced to the results of domination of a specific cognitive function while this domination is reduced to a specific form of religious-intellectual experience (the flash of insight).

3. To my opinion, Newberg's persistency in arguing for the integration model (of neurology and theology) is the major shortcoming of his project. Namely, such integration would prove to be detrimental both for science – because it would stumble under the

⁹³ Neurotheology is seen as an integrative part of theology by Wilfried Apfalter, “Neurotheology: What Can We Expect from a (Future) Catholic Version?”, *Theology and Science*, 7:2 (2009) 163–174.

“speculative” burden of theology – and for theology as well because it would succumb to an ill-befitting research model. In other words, theology would be forced to formulate its views in the forms that could be experimentally refuted, i.e. empirically falsifiable.⁹⁴ It is for this particular reason that neurotheology is to treat the grace of the Holy Spirit as objective energy which can be measured by scientific methods, by all means expecting that the grace will be shown under a PET or some other scanning machine at the exact pint in time when the praying person wishes for.⁹⁵ Otherwise, the very “essence” of prayer could never be measured. Also, within the integration model theology is tied to a scientific paradigm that could prove obsolete or completely wrong. In this case, theology would be forced to reformulate its basic tenets in line with the paradigm shifts. One could argue that it was this integrating model of science and theology that was imposed by the Latin West during pre-Copernican period the results of which are well-known.

A plausible conclusion on the problem of the integration model appears to be the one proposed by Norman and Jeeves – the deficit of science and the surplus of speculation.⁹⁶ A more appropriate model could be the model of dialogue within which theology would not be substantially bound to the current scientific paradigm and forced to reinvent its basic principles every time a paradigm shift occurs.

We see Newberg’s model of neurotheology becoming acceptable for Christian theology provided it undergoes the following changes:

4. That it operates within the framework of theology by informing its theory and practice. In the field of practice it would assist pastoral care by, for example, taking into account the noted differences between neurological, psychological and spiritual diseases in pastoral care as well as by establishing potential relations between these types of diseases with religious impetus. In the field of theory it could inform theology on current findings of neural sciences within neurotheological hermeneutics.

5. That it does not aspire after the status of meta/mega-theology. Any universal theology is unacceptable for Christian theology. On the other hand, for the purpose of scientific study of religion, the segment of a neurological experience is but one of many and not the most important one.

6. That it does not aspire to explain all religious phenomena, both practical and theoretical, through the prism of experience so as to avoid the injustice being done to both the complexity of the phenomenon of religion and the positions taken by its proponents.

7. That it does not seek to integrate scientific and theological knowledge but to make them enter a dialogue for the purpose of mutual reconsideration.

We hold that should neurotheology undergo these changes it could prove worthy of developing into a fully-fledged scientific discipline.

⁹⁴ If it’s even possible to define theological statements in such way. Although he advocates integrative approach, Newberg doesn’t demonstrate in which way it would be possible to formulate theological content in an empirically falsifiable way. Bruce MacLennan holds it to be possible, claiming boldly that the religious phenomena are public and objective in their nature and that theological statements can be objectively proved or disproved. Cf. Bruce MacLennan, “Evolutionary Neurotheology and the Varieties of Religious Experience”, y: Rhawn Joseph (Ed.), *NeuroTheology: Brain, Science, Spirituality, Religious Experience*, University Press, 2003, 305–315.

⁹⁵ Newberg mentions only once that spiritual experiences are “to some extent, all spontaneous” – cf. A. Newberg, *Principles of Neurotheology*, 155.

⁹⁶ Cf. W. Norman, M. Jeeves, *Op.cit.* 251.

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