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THE POTENTIAL OF NEUROTHEOLOGY FOR THE THEOLOGY OF THE BODY AND SEXUALITY

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Abstract

We witness a growth in the number of socially acceptable interpretations of the body and forms of experiencing sexuality. The embodied turn in research is developing. The Catholic Church has to answer both issues and, so requires resources for the theology of the body and sexuality. One of such resources may be neurotheology. In this article, I present three cases of neurotheological research. I show neurotheology as a stimulus to theological hermeneutics of the body and sexuality. I posit that neuroscience can inspire: (1) the interpretation of the body as a co-participant with the soul in the salvation, (2) the understanding that the experience of sexuality includes the corporal and spiritual dimension and may participate in the experience of faith, (3) the pastoral approach to persons that need a reconciliation of their faith and sexuality. My study presents the development in theology of the body and sexuality in analogy to the impact of Norbert Elias' concepts for the sociology of body and embodiment.

Keywords: brain, neuroarthistory, theology, body, Catholic theology

1. Introduction

The sexual revolution in Western countries is one of the reasons for the modern social and theological discussion on the importance of body, gender and sexuality in Catholic theology. The growing number of socially acceptable interpretations of the body and forms of experiencing sexuality multiplies the experiences of people under the pastoral care of the Church, which the Church seeks to answer. Moreover, we see a growing expectation that the Church will change her attitude to the previously condemned forms of experiencing sexuality [1, 2]. The Church is noticing these expectations and proposes some pastoral changes in the accompaniment of people in their theological recognition of sexual activities [Pope Francis, *A Post-Synodal Apostolic Exhortation Amoris Laetitia*, United States Conference of Catholic Bishops, Washington DC, 2016; In-flight press conference of His Holiness Pope Francis from Azerbaijan to Rome, Papal Flight 2 October 2016, Vatican, 2.05.2020, https://w2.vatican.va/content/francesco/en/speeches/2016/october/documents/papa-francesco_20161002_georgia-azer

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baijan-conferenza-stampa.html]. Nevertheless, if the Church wants to better acknowledge the above expectations, she needs resources for the change her attitude. These resources can be art or Science. Art presents a subjective view so it may have insufficient argumentative force in an academic theological discussion. Meanwhile, thanks to its methods, research data analysis, and conclusions of a theoretical and practical nature, Science offers more objective content than art. Therefore, the Church can find Science as better resource for the above considerations, especially neurotheology [3]. Hence, this article evaluates neurotheology as a stimulus for the theology and hermeneutics of the body and sexuality. In a way, this article combine Theology with some statements of neuroscience. This approach emphasizes the searching for relations between Science and Theology. More broadly, I ask about the cooperation of *fides et ratio*, faith and reason [3]. I will present the matter: as an element of the embodied turn in Science, and in the development of Theology as an independent discipline.

Thus, this article will show the context of the embodied turn in research. Next, I will describe the method I used and the state of the art. Moreover, I will describe three cases of neurotheological research. Then, I will evaluate neurotheology as a resource for the theological hermeneutics of the body and sexuality. I will posit that neuroscience can inspire: (1) the interpretation of the body as a co-participant with the soul in the salvation, (2) the understanding that the experience of sexuality includes the corporal and spiritual dimension and may participate in the experience of faith, (3) the pastoral approach to persons that need a reconciliation of their faith and sexuality.

2. Contexts - the embodied turn

Over the last few decades, methods of embodied research have enjoyed great interest in social and cultural studies [4]. For instance, the embodied turn and the application of neuroscientific theories to academic research contribute to the development of Sociology. As this entails the evolution of one discipline, the embodied turn can further inspire developments in Theology. German sociologist Norbert Elias criticizes the dichotomous interpretations of reality especially visible in theoretical narratives, expressed in such antitheses as “nature and culture”, “body and spirit” and “subject and object” [5]. This prompted Elias to search for theoretical schemata and methodological strategies that would help to grasp culture in its specific individual forms and explain personal experiences in their socio-historical context. As a result of his research, Elias developed the process-oriented narrative [5, p. 16; 6; 7], in which he emphasizes the combination of biological and social processes. He found that they overlap when, for example, people learn to speak a language for the first time [5, p. 19-20]. Moreover, Elias states that the mixing of biological, psychical, social, and individual processes is essential for our understanding of the human condition [5, p. 6, 37, 128]. Therefore, he posits that Science should show how social and cultural imperatives are expressed in the body and how they are inscribed in the human body because “all forms of human behavior can be placed on the map of the organism” [5, p.

88]. Elias's proposition made sociologists notice the bio-psycho or bio-spiritual dimensions in people. A far-reaching effect of this change in narrative orientation has appeared in the implementation of neuroscientific theories to Sociology. Aware of the fact that social forces play a key role in shaping human biology, *Nature* called sociologists to cooperate in the preparation of new publications [8]. The case of Sociology's development into the sociology of body and embodiment reveals the potential that lies in the development of Science and it is a great example for Theology: about the resignation from binary narrative about physical and extra-physical elements of individual experience by applying the neuroscientific approach and the perspective of experience as a process. Moreover, the development of sociology offers views on the body (e.g. by Pierre Bourdieu [9]) that enrich Theology. I employ the above insights in this article.

The above observations may inspire Theology, which has so far revealed its own approach to the matters of the body and sexuality. In the age of sexual revolution, the Church's primary document on the experience the body and sexuality is Pope Paul VI's 1968 encyclical letter *Humanae vitae* [10]. Further statements were offered by John Paul II in his academic and literary works [11-14]. These documents recommended sexual abstinence for the non–married [10, p. 1-11; 15]. Any sexual practices are viewed to be sinful except for those between a man and a woman after celebrating the sacrament of Matrimony [15, p. 560-576]. As "morally unacceptable" are presented acts of contraception, direct sterilization, masturbation, premarital sex, homosexual coitus and artificial fertilization [14, p. 31].

A new theological reflection on body, gender and sexuality was supposed to be the post-synodal apostolic exhortation *Amoris Laetitia* by Pope Francis [Pope Francis, *A Post-Synodal Apostolic Exhortation Amoris Laetitia*, United States Conference of Catholic Bishops, Washington DC, 2016]. It was expected by supporters of the liberalization of Church thought on sexuality. They awaited a revision of the Church's attitude toward body, gender and sexuality, especially toward the non–married including the LGBT+ persons, namely lesbian, gay, bisexual, transgender and other non-heterosexual persons. The need of the liberalization of Church teachings about the body has long been indicated by many progressive theologians, including bishops and cardinals [2]. For example, the American Jesuit James Martin shows that some elements of the Church language should be changed to become more inclusive [J. Merritt and J. Martin, *Religion News Service*, http://religionnews.com/2017/06/06/this-top-vatican-official-is-quietly-moving-catholics-toward-lgbt-inclusion/, 6.06.2017]. For example, Merritt and Martin stay that instead of using 'objectively disordered', one should introduce a more pastoral term such as 'a different order' in such fragments of the *Catechism* as: "The number of men and women who have deep-seated homosexual tendencies is not negligible. The inclination, which is objectively disordered, constitutes for most a trial." [http://religionnews.com/2017/06/06/this-top-vatican-official-is-quie tly-moving-catholics-toward-lgbt-inclusion/]

Pope Francis presented his own pastoral approach toward the interpretation of body, gender, and sexuality [Pope Francis, *A Post-Synodal Apostolic Exhortation Amoris Laetitia*, United States Conference of Catholic Bishops,

Washington DC, 2016]. On October 2, 2016, he said, "I have accompanied people with homosexual tendencies, I have also met homosexual persons, accompanied them, brought them closer to the Lord, as an apostle, and I have never abandoned them. People must be accompanied, as Jesus accompanies them." [https://w2.vatican.va/content/francesco/en/speeches/2016/october/documents/papa-francesco_20161002_georgia-azerbaijan-conferenza-stampa.html] He did not change moral theology teachings but, instead, drew attention to the issue of the language and style of expressing opinions about the place and the role of sexual experience for Christians.

The Church tries to respond to social expectations regarding the change of narrative about the body and sexuality. Seeking resource to transform its approach, the Church could recognize neurotheology as a stimulus to develop the theological hermeneutics of the body and sexuality. The term 'neurotheology' was first used by the English novelist Aldous Huxley in the 1962 novel *Island* [16]. In scientific context, the term was proposed in James Ashbrook's 1984 article 'Neurotheology: The Working Brain and the Work of Theology' [17]. Neurotheology is the biotechnological study of neural subjects with subjective experiences of spirituality. It is also known as the neuroscience of religion or spiritual neuroscience. The field employs methods for the neurological imaging of brain activity, for example electroencephalography (EEG), functional magnetic resonance imaging (fMRI), and eye-tracking. Among other things, neurotheologians describe the relation between brain activity and individual spiritual experience in the context of relationship with God [17, 18].

This article argues for the relevance of neurotheology for the theology of the body and sexuality based on a discussion of selected neurotheological studies referring to Biology, neuroesthetics, and Cognitive science, e.g. cognitive art history. The discussion will refer to recognizing Theology as an interdisciplinary narrative about human experience. After all, Theology remains practiced in the light of the Popes' documents on the theology of body and sexuality. The body and sexuality are presented jointly because they are related to each other in the Church moral teachings. Moreover, the body and sexuality find better expression in embodiment when treated jointly, not in separation with the proviso that "embodiment is the quality of having a body and perceiving and being in the world through the body" [19]. So, "the term 'embodiment' refers quite precisely to the process by which the object-body is actively experienced, produced, sustained, and/or transformed as a subject-body" [20]. Hence, as Pierre Bourdieu states, "the body is in the social world but the social world is in the body", which is manifested in behavioural habitus that means "corporeal knowledge", "history incarnated", and "a kind of infallible instinct" [9]. With such a perspective, this article wishes to impact the interdisciplinary discussion on the relationship between, on the one hand, the body and sexuality, and on the other hand, faith, religion, and Catholic theology. It is a discussion which is the subject of interest of Theology as it can dialog with the modern world and the issues it raises. This topic provides content for priests who accompany believers and try to present a correct interpretation of the body and sexuality in the light of Catholic religion. This

article offers examples of using Neuroscience in another discipline, namely Theology. Therefore, the article studies the relationship between Science and Theology, thus operating in the field of fundamental theology.

3. Method and the state of the art

This article operates in the field of Theology. The world includes the symbolic and social spheres, namely differential visions of human being, life, the body, sexuality, gender, religion and the Revelation. Fundamental theology focuses on three functions: (1) justifying (hermeneutical-foundational), (2) dialogizing and (3) apologetic [21-23]. The justifying function (1) shows the Revelation, the subjects of faith, and their canonical theological interpretation related to the Church thought. The dialogizing function (2) refers to humans experience and reality; it remains open on the modern world like in the metaphor of "open window" by René Latourelle or of "standing in the threshold of the open door" by Hans Waldenfels [24]. In this function, Theology should reconsider its previous thought, question it, and risk changes; it should dialog with persons that doubt, do not believe, or are members of other religions. The apologetic function (3) includes two activities: to formulate rational arguments for faith and to compare these arguments with other statements to diagnose their rational value [24].

These three functions determine three stages of the research method of fundamental theology applied in this article. First, the frame of justifying includes the Catholic thought on the body and sexuality articulated by Pope Paul VI in *Humanae vitae* [10] and his successors. Next, the dialogizing function comprises the assessment of the sociocultural experiences of the body, gender and sexuality since the sexual revolution. This experience is an element of the individual tension between, on the one hand, the experience of body and sexuality, and on the other hand - faith. The dialogizing function is also expressed in this article by combining Theology with selected statements of neuroscience. This approach emphasizes a dialog between Science and Theology, along with a cooperation of *fides et ratio*, faith and reason [3]. Then, the last section includes an evaluation of neurotheological insights presented in this article in the light of its potential for theological hermeneutics of the body and sexuality. This article employs Church documents on the theology of body and sexuality, along with academic publications on neurotheology and neuroarthistory. Another resource comes from my original research regarding the perception of the retable of the main altar in the Holy Spirit Church in Toruń. Moreover, this article includes the developments of Sociology made with Norbert Elias's ideas in the sociology of the body and embodiment. The sociological content is presented in analogy to the development of the theology of the body and sexuality.

So far, neurotheology was scrutinized for its potential use in Theology or Philosophy of religion in general [25]. On the one hand, neurotheology was recognized as an interdisciplinary insight that can split into a reductionist and a religionist neuroscience of religion. On the other hand, scholars noticed its apologetic and integrative value indicating that neurotheology can develop

scientific reflection in three fields: (1) Philosophy and Theology, (2) Cognitive science, (3) Psychology and Religious studies [26].

As for Catholic theology and its links with neurotheology, scholars articulate the following concerns: "The fact that it took the Catholic Church more than three hundred years to apologize for imprisoning Galileo illustrates the potential problem that can arise when religious beliefs inappropriately reject clear and careful Science. The results of scientific research and its strong appeal to reason frequently seem a better approach to many individuals." [27]

Newberg's opinion appears partly justified. On the one hand, the Church presents a traditional viewpoint by criticizing non-traditional propositions of Science. On the other hand, the Church must be interested in Science as a source of new knowledge. As a result, this makes the Church cautious about neurotheological theories and hypotheses. Nevertheless, with advances in research, the Church can determine just how much to follow neurotheology. For as many believe, the Church established fides in the content aspect, that is as a collection of propositions and statements that articulate the content of God's timeless Revelation; but the Church's relationship to Science has a temporal scope, which may change over time with new scientific discoveries.

There appeared some general proposals on mixing neurotheology and Catholic theology in scholarly works [28-30]. The debatable points between neurotheology and Saint Thomas Aquinas's philosophy are evaluated in other [31]. Yet others indicated the common points between the concept of dialogical soul proposed by Joseph Ratzinger and neuroscience's idea of "the embodied mind" [32]. However, there was no proposition for considering neurotheology in the light of theology of the body and sexuality. I argue that neurotheology as a resource for theology of the body and sexuality offers an interdisciplinary and transdisciplinary approach because the former develops academic theological thought, along with the social and individual interpretation of the body and sexuality in the context of faith. In my opinion, neurotheology inspires the interpretation of the body as a co-participant in salvation and it enriches the reconciliation of individual faith and sexuality. In this context, below I will offer three selected case studies, which exemplify neurotheological research.

4. Case one - Michael Persinger and the God helmet

The first documented medical research on neurotheology was conducted by Michael Persinger, a professor of Psychology from Laurentian University in Ontario, Canada, in 1987. He wanted to prove that all kinds of spiritual experiences can be artificially induced in a laboratory by stimulating the adequate parts of the brain with the use of an electromagnetic field. He used the so-called God helmet invented by Stanley Koren originally called the Koren helmet and the Koren octopus. The God helmet emits electric current through a coil of copper wire that goes to the test subject. The current generates rapid fluctuations in the magnetic field that permeates the scalp and skull without interference; this creates an alternating electric field in the cerebral cortex under the coil. It leads to a

neuronal depolarization, which can stimulate or inhibit the functioning of the cortex [33]. Therefore, when the God helmet is placed on a participant's head, the apparatus generates very weak magnetic fields that Persinger calls the 'complex'. The complex is directed to temporal lobes. Like other neural stimulation with low-intensity magnetic fields, the complex is approximately as strong as those generated by a land line telephone handset or an ordinary hairdryer [33].

Persinger partially confirmed his hypothesis: 80% of the 600 participants in the experiment reported 'mystical experiences and altered states' and an impression of being in unity with the environment. Believers spoke of feeling the essence of God, Christ, a guardian angel or a late loved one [34]. In Persinger's opinion, this research suggests that spiritual (including mystical) experiences result from physical (e.g. magnetic) and biochemical effects on the brain and other internal processes. Persinger believes that there is one specific part of the brain responsible for generating religious experience, which is to be a quasi-pathological phenomenon. The experience of religious phenomena results from an abnormal state of the brain in the limbic system, which is a set of brain structures that direct impulse and emotional activity, including the hippocampus, the amygdala, the angular gyrus and the hypothalamus. Persinger's reports caused a discussion among academics. Attempts to replicate the experiment were conducted with no success, but Persinger argued that they were technically flawed [34]. Many insisted that what explained these unusual experiences were personality differences among participants (positive results were described by Roxanne Khamsi [35]; negative results were presented by Christopher French, Usman Haque, Rosie Bunton–Stasyshyn and Rob Davis [36]).

Despite the lack of an unequivocal confirmation of Persinger's results, his findings undeniably provoked a new chapter of discussion on the psychological, physical and metaphysical dimensions of spiritual experience. This issue was developed by an American neuropsychologist Rhawn Joseph, who combines it with the experience of sexuality. As Kevin Seybold describers, Joseph notes that the structure of limbic system's components - such as the amygdala, the hippocampus and the inferior part of the temporal lobe - is considered the basis of religious and spiritual activities, while these structures are also involved with sexual activity, anger and irritation [37]. According to Joseph, this is why people created in their mind an image of God and presented it in the Old Testament as one whose presence of the sacred and transcendent power immensely connects with sexuality, anger and fear [37].

Another researcher interested in Persinger's work was Vilayanur Ramachandran, a neurologist and Director of the Center for Brain and Cognition at the University of California, San Diego. Like Persinger, Ramachandran listed two neural traits of religious experience: localizationism and abnormality. Localizationism assumes that specific experience is attributable to one specific brain structure. Abnormality means that a religious experience is a quasi-pathological phenomenon, namely an abnormal state of the brain's limbic system. Based on his own research on people with epilepsy, hypergraphia, obsession with religion, and exalted behaviour Ramachandran states that religion can be a biologically sanctioned property of human being. He believes that a specialized

module could be created in the brain through natural selection to generate religious experiences in order to give a man a sense of happiness, care and order in the Universe, along with high self-esteem. He considers it probable that religious experience may be merely an element of other emotions considered in relation to temporal lobes [38].

5. Case two - Andrew Newberg and the absolute unitary being

The next case study from the field of neurotheological research presents different conceptions of reasons for faith and other spiritual experiences. University of Pennsylvania's Andrew Newberg is interested in similarities in descriptions of mystical experience in people of different religious affiliations. In the 1980's Newberg examined more than twenty representatives of various spiritual practices, e.g. Franciscan friars, Tibetan monks, and members of the Pentecostal Church. Newberg applied single-photon emission computerized tomography (SPECT), which uses gamma radiation to create a spatial image of the biological activity of any area of the test subject's body [18]. Considering here only Newberg's work on Christians, the course of the experiment was as follows: when a person was engaged in prayer and feels a special closeness to Jesus Christ and communion with Him, the person pulled a string to signal this experience to the scientists. Then, a liquid radioactive contrast was injected into the participant's body. The contrast entered the brain and the neurons that are naturally active during prayer. This showed that the prefrontal cortex and the temporal lobe are active during prayer and meditation. The prefrontal cortex is responsible for focus while the temporal lobe - for the feeling of something bigger and more powerful.

Newberg and his team state that the parts of the brain that part take in mystical experience are the prefrontal cortex and the posterior upper parietal lobe, the latter being an orientation and association centre that mediates the body's position in relation to the outside world. Thus, Newberg inclines toward the theory of equipotentiality, which argues that the brain works as an ensemble in which one area can learn what another area could do. Newberg concludes that - despite his experiment - we cannot state with certainty that physical stimulation of the appropriate part of the brain is sufficient to generate a transcendental sense of oneness with the sacred. Moreover, he acknowledges that there is no way to determine whether the neurological changes associated with spiritual experience indicate whether the brain produce these experiences or receive them by connecting to some spiritual reality. Thus, Newberg and his research partner Eugène d'Aquili believe that religion has no neuropathological background. Furthermore, they believe that some unchanging, culturally independent elements of religious experiences and beliefs are universal, which they call an absolute unitary being (AUB) associated with every mystical experience [18, p. 147; 39]. They emphasize the brain's perennialist feature, which means that eternal and immutable elements of religious experience and beliefs do exist, and these both elements do not deny the paradigm of localizationism and equipotentiality [40].

As we may see, Newberg's study presents a different approach to spiritual experiences than Persinger's and Ramachandran's. Newberg cooperated with the believers by including their testimonies about spiritual experience. Moreover, he did not define spiritual experience as a sign of mental illness, as Persinger and Ramachandran suggests when stating that spiritual experience is a quasi-pathological phenomenon. Newberg accepts the believers' approach about the sources of faith and does not oppose their beliefs. However, in the context of specific neuroscience and localizationsm, Newberg tries to define the section or sections in the brain in charge of spiritual experiences just like Persinger. In the light of later research, other neuroscientists recognized this aim as incorrect. There appeared opinions that any brain area does not work on just one activity, but cooperate with the others. Therefore, an attempt to find a God module in human brain was criticized [41, 42].

Because of the attempts of defining the places of God's presence or communication with people were recognized as methodologically incorrect, there appeared other research proposals in the neurotheology. The above case studies consider what they deem a direct religious experience following the reasoning: a human - God or a human - the sacred. Another perspective was undertaken by research on religious experience inspired by means of an external stimulus in the form of a cultural text. Therefore the next case study refers to religious experience observed in the cultural context: a human - a text of culture - God. This approach is presented by neuroarthistory.

6. Case three - neuroarthistory as an auxiliary science of Theology

Neuroarthistory can be inscribed in neurotheology as it presents the religious experience as induced by the context of the perception of a text of culture. In my research, the text of culture is an art work with a visual equivalent. Both neuroscience and neuroarthistory refer to the findings of researchers such as Władysław Strzemiński on the theory of looking at the paintings [43], Rudolf Arnheim on art and visual perception [44], John Onians who coined and defined the term 'neuroart history' [45], Margaret Livingstone with her demonstration that commonalities exist between artistic sensibility and human visual apparatus [46], and Łukasz Kędziora with his transdisciplinary approach toward research on visual equivalents of artworks [47, 48]. Neuroarthistory discusses the process of the sensuous experience of art. This transdisciplinary approach contains a reflection on the vitality and diversity of artistic activity in categories of the senses. In other words, the expressed emphasizes the sensuous context of art's existence and its impact on people through senses of sight, hearing, and in some cases, smell. This refers to the perception of works of body art and artworks that refer to sexuality and gender issues; it draws attention to the hermeneutic circle that arises between an artist, a work and a recipient by enabling biofeedback research, diagnosing canvas, and indicating the role of mirror neurons in the shaping of one's activities [47, 48].

An example of neurotheological research that refers to a text of culture is my analysis of the perception of the late Baroque retable of the main altar in the Church of the Holy Spirit in Toruń, Poland. My study forms the basis for determining the correctness of the Council of Trent 1545-1563 and post-conciliar recommendations regarding the impact of art on human faith. My analysis refers to the findings of Ramachandran and the cognitive philosopher William Hirstein [49, 50], I employ their insight to characterise extension of the proportions of images of the evangelists for baroque vertical sculptures (Figure 1). This extension qualifies as the 'supernormal stimulus', which Ramachandran and Hirstein claim to be introduced into an artwork through the inclusion of an unnatural deformation. This strong exaggeration creates a 'super incentive' that can clearly stimulate neurons. The recipient's reception fields react to exaggerated, excessive shapes. The limbic system is stimulated. As a result, the viewer feels aesthetic emotions. Thus, the supernormal stimulus affects the recipient's perceptive and emotional system by directing her attention to the essential feature of a given object, then to a better understanding of the intra-image story and, consequently, to the idea implemented by the artist [49, 50]. Therefore, in the case of the evangelists' sculptures from the Holy Spirit Church in Toruń a specific elongation is consciously or subconsciously noticed by the viewer, whose attention is drawn to the upward physical direction of the figures. This introduces dramatic dynamics and conveys the idea of the spiritual vertical orientation of the characters toward the sacred.

Figure 1. The evangelists' sculptures and the Crucifixion of Jesus from the Church of the Holy Spirit in Toruń.

In such a way, my research accentuates the existence of formal features of an artwork that is known to attract the viewers' eyes, as is known from neuroscience research. This fact becomes the basis for determining how given

stimuli and artworks affect recipients, and especially whether they inspire a religious experience. In my research, I emphasize that the participants of the Council of Trent thought that characters in art should be presented communicatively, simply and in accordance with the Christian iconographic tradition so as to influence people's faith and demeanour. However, the thought of Ramachandran and Hirstein undermine the legitimacy of the Council's recommendation to create simple realistic images. The researchers establish that simple traditional sculptures and paintings with a clear narrative do not affect viewer's perception and emotional system as much as images that contain a supernormal stimulus with an unnatural form. Thus, we should assume that the works enriched with unrealistic formal features - like elongations or disproportion of bodies - implemented the other postulates of the Council better. The postulates recommended that artworks should focus people's attention as they are sources of people's knowledge about salvation; they recall the benefits given to people by Christ and show models of saints to be followed [51].

The above research on neurotheology in the context of a selected text of culture is less controversial than the attempt to pinpoint a God module in the brain. The analysis of an artwork with religious content accentuates the perception of a masterpiece. Moreover, the analysis presents people as participants of culture who react to the form and content of an artwork. Their reactions include neural dimension combined in the over-biological, spiritual and divine source of faith. This approach employs neuroscientific theories and results of research, along with a coherent theological understanding of faith and supernatural reality. As such, this approach may be a good starting point for the evaluation of the neuroscience's impact on theological interpretation of the body and sexuality.

7. Discussion

The above experiments and theories may be viewed as controversial. On the one hand, Persinger's and Newberg's studies are recognized as relevant for the development of research on neuroscience and the Philosophy of religion, and neurotheology. On the other hand, they may be questionable due to their methodological value. They included invalid assumptions that parts of the brain have but one function, resulting in their attempts to find a God module as an area in the brain in charge exclusively of spiritual experience. Furthermore, Persinger concludes that spiritual experience only results from physical and biochemical effects on the brain, he assesses the processes that occur in the brain as a reduction of the complex phenomenon of faith, and he contradicts the Catholic theology. The Church defines faith and other religious experiences as coming from God [15]. Therefore, we should note that the above neurotheological experiments have a peculiarly narrow approach to faith experiences such as praying. According Persinger, Joseph, and Ramachandran, praying happens in the brain without any contact with a supernatural being. This approach is to be captured by brain scans, which do not show any supernatural contact with God. This research specificity highlights the methodological limitation of neuroscience toward any mystical experience.

Moreover, some mention the perennialist feature in the context of neurotheology. The feature means that eternal and immutable elements of religious experience and beliefs exist; and these elements do not deny the paradigm of localizationism and equipotentiality [40]. In my opinion, the perennialist feature is autonomous with respect to every human culture, and so - also - religion. I stay that the perennialist feature's sources can be evolutionary, which is suggested by biological development of the brain.

Regarding Joseph's insight on the limbic system's components as being in charge of the creation of the image of an angry God immensely related to sexuality - described in Kevin Seybold [37] and John Horgan's works [40, p. 81] - we should note that this theory shows God as a result of human creation, not as a self-manifested person - as Catholic theology believes. Moreover, Joseph's statement does not apply to God of the New Testament. Therefore, in the light of Catholic theology, Joseph's statement defies the Revelation by claiming that God is only the result of the work of the human brain.

Despite the above limitations, neuroscientific experiments and theories remain relevant for the development of Science, especially as a sign of asking great questions such as: what is the biological dimension of spiritual experiences? Or, what is the role of neural equipment in spiritual experience? These experiments accentuate the scientific aspect in the study of the experience of faith. Thus, neurotheological questions and research could be considered in the context of personalistic theology. They should be recognized as research in the field of fragmented religious experience, meanings analyses of the neural dimension of the complex process of spiritual experience. Thus, they should always have the status of case studies. Perhaps, future research will contribute to building a new taxonomy of religious experience [52]. As a result, practicing neurotheology in personalistic theology can be a turning point for a bottom-up theology that will empower the faithful in their faith experience and will highlight individual spiritual experience. It might offer interpretations that will help to better understand the individual experience thanks to descriptions of the corporal, neural and biochemical processes. Thus, this knowledge has an interdisciplinary and transdisciplinary value, providing background to the preparation of a pastoral theology more adequate to human experience. For example, better knowledge of the perception processes may be used to the preparation of a more adequate artwork and, later, museum and gallery exhibitions for pastoral aims [53, 54]. This approach is different from the top-down theology that concentrates on analysing the thought of the hierarchical Church.

The above notes refer to the general potential of a dialog of neuroscience and Theology, including the theology of the body and sexuality. As I remarked in the introduction, the experience of the body in the context of experiencing sexuality was shown as morally good only for the married. In part of the Church narrative, sex, gender and the body became a taboo or an uncomfortable tool of coercion experienced mostly for reasons of procreations. Too rarely are they presented as a space for experiencing beauty, spirituality, embodiment, the sacred, or the ontic beauty of humanity [1]. In this context, neurotheology presents the

body as both the subject and the object with which we experience spirituality. This means not adopting an exclusively evolutionary narrative to seek a clarification of the genesis of God's image in one's brain. In the theological (confessional) context, the biological approach should harmonize and correlate with the supernatural approach that assume the Revelation. In this light, the body is recognized as a relevant participant in the saving dialog between God and humans. The proof on this interpretation comes from Jesus Christ. His body was the element of humanity's redemption. He died and then came back to life. So, Christ's body became a testimony of his human nature, his death and resurrection, and by the same token, the foundation of theology of the body in the context of Christological research [55-57]. In the neurotheological approach, the brain, eyes, ears and other body's organs engage in processes of perception of texts of culture such as paintings or sculptures, but also the Holy Bible or sermons. Therefore, the body as whole and also the body's organs are recognized as an integral somatic part of being, but also as instruments in communication with other persons and texts of culture, which initiate or support individual spiritual experience. Moreover, the body presents a way to express spiritual experience like with the somatic reactions to some spiritual experience. Next, the body is the natural reality through which we can experience the supernatural reality. After all, in everyday experience, the soul cannot be saved unless in union with the body so that what is physical in some sense participates in resurrection. All of the above meanings are inter-dependent and complementary so they should not be separated but integrated and viewed as a whole in the process of life.

The above definitions influence the interpretation of human sexuality. Presenting the person as an individual and unique being with two equally relevant dimensions of salvation (corporal and spiritual) accentuates the cooperation of physical and extra-physical dimensions of sexuality, in sexual intercourse. Theology recognizes that a 'sexual union' refers to the physical and spiritual realities. It is "a path of growth in the life of grace for the couple. It is the nuptial mystery" [Pope Francis, *A Post-Synodal Apostolic Exhortation Amoris Laetitia*, United States Conference of Catholic Bishops, Washington DC, 2016, no. 74]. The Church presents sexuality together with intercourse: as sources of anxiety, fear, awe, or trust in relationship with God. She states top-down and dichotomously that: (1) intercourse supports spiritual communion between a wife and a husband [58], (2) that having sex among other people than a married couple always signifies a "disorder of the will" [15, p. 435] when the will expresses the desire of extramarital intercourse and the soul simultaneously wants to remain faithful to God. Thus, according to the Church views, sexual intercourse among people other than a wife and a husband supports negative emotions and experiences, which destroy internal spiritual order. This statement includes a qualitative assessment of one element of sexuality: sexual intercourse. We may debate this assessment by using the approach of neuroscience together with individual's testimonies [59-61]. Let us closely follow the status quo. Thanks to neurotheology, we know that experiences (including intercourse) manifest in one's body, psyche and relations with others. We can define and describe the neural manifestations and consequences of sexual intercourse. From psychological, social

and medical studies, along with spouses and non-spouses' testimonies [59-61], we know that an intercourse has a positive deep spiritual dimension that is not recognized in the frame of 'disorder of the will'. In turn, we do not have scientific sources that would support the qualitative assessment that non-spouses always experience a negative spiritual experience through intercourse. Analogical conclusions appear regarding other elements of sexuality. In other words, people can experience spiritual reality through the body and sexuality (sexual intercourse). Neuroscience cannot present any qualitative binary for evaluating sexuality in a way the Church does in moral teachings. Used as a source to reflection on the theology of the body and sexuality, neuroscience can describe the corporal and neural dimensions of individuals' sexual experiences by including their testimonies on the experience of a parallel spiritual reality. Hence, stating that a human being has the body and sexuality, through which he or she experiences reality, we can show that body and sexuality participate in the of spiritual reality. The qualitative assessment of this participation cannot be evaluated as universal because the assessment is based on individual recognition. We may view this point as relevant for the pastoral approach toward persons who experience their sexuality in the same or other ways than recommended by the Church. For example, the above refers to people who live together without the sacrament of matrimony and for some reasons cannot marry in the Church, only have a civil marriage, or are divorced and remarried may receive the Holy Communion [Pope Francis, *A Post-Synodal Apostolic Exhortation Amoris Laetitia*, United States Conference of Catholic Bishops, Washington DC, 2016, No. 247, 299-312]. Priests cannot deprive them of the spiritual dimension of physical and extra-physical relationship. They "must know that, for the sake of truth, they are obliged to exercise careful discernment of situations" [58].

The point presented in this article accentuates the interaction between physical and extra-physical elements of individual experience in the light of the embodied turn (in Sociology) and following Elias's postulates. Following sociological thought, a resignation from the dichotomous interpretation "body versus spirit" [5] enriches the holistic approach to human, the body, and sexuality in a process-oriented narrative. This point seems to be relevant for Theology and the pastoral approach of the Church. Both for neurotheology and theology of the body and sexuality, a resignation from the spiritual reality - proposed in theology in the light of faith as a supernatural perspective - reduces the study of humans to a search for one specific physical equivalent of the soul in the human body or even presents the soul as something material like in René Descartes's statement about the pineal gland as the link between the soul and the body [62]. Simultaneously, the diminishing importance of the body as matter results in spiritualism. Both approaches are reductionist and harmful. As long as these two approaches (biological and supernatural) are presented as contradictory, we will not witness internal, intrapersonal harmony. This point seems to be relevant for individual's tension between sexuality and faith [1]. Moreover, the fusion of the biological and supernatural perspective allows for the preservation of the mystery in experiencing religion. The consideration of human biology and spirituality in separation

presents people as fragmentary, not holistic. Thus, neurotheology itself - done in fusion a join biological and spiritual (theological, supernatural) perspective - does not destroy but supports a mature reflection on a humans, along with the anthropological dimension of faith and religion.

8. Conclusions

Together with individual testimonies about extra-physical elements of individual experience of embodiment, neurotheology might inspire the hermeneutics of the body and sexuality. As a resource for theological reflection and Church teachings, neurotheology shows a narrative linked to the processual perspective on individual experience. In a broader take, the latter manifests the ongoing impact of Church thought on interpretations of the body, and so a transformation of what we understand by behavioural habitus and 'nature' in such a way that the lines between them become blurred [8]. It supports the search for answers to such questions as 'Is sex a sin?' or 'Will LGBT + person be saved?'. After all, such inter- and transdisciplinary theological questions are asked by individuals and groups, and these questions leave traces in human bodies: e.g. in the neural and psychical spheres. As Sociology notices, the resulting traces can be diagnosed based on health disproportions and emotional disorders captured in the declining vital forces of social health [63, 64]. Thus, in both sociological and neurotheological context, embodimental issue includes a reflection on sexual experiences of humans, as well as reinforced and stigmatized social conventions supported by Church teachings.

Summarizing, the Elias's postulate of resignation from dichotomous discourse of physical and non-physical dimensions of reality - and then employing the process perspective - initiated the development of embodied sociology, but it also strengthened neurotheology as a resource for theology of the body and sexuality. Neurotheology can be implemented in theological reflection on the body and sexuality in the context of experiencing embodiment. Theology must take embodiment seriously if it wants to participate in discussions on current scientific issues. In this context, the potential of neurotheology offers to interpret the active role of the body and sexuality in the experience of faith. The above shows that embodiment means being in the world through the body and sexuality [19], and in the light of Theology, that Incarnation is the way to Salvation. Thus, the object-body becomes the subject-body as an internal part of a human being with soul [20]. This is not contradicted by the fact that, using the neuroscientific approach, the God module cannot be localized in human's brain. Similary, "we cannot locate meaning in the text, life in the cell, the person in the body, knowledge in the brain, a memory in a neuron. Rather, these are all active, dynamic processes, existing only in interactive behaviours of cultural, social, biological, and physical environment systems." [65, p. 28] In this context - and in the light of Theology which shows faith as coming from God - the John Dewey's statement become justified that "Experience does not go on simply inside a person, [that] genuine experience has an active side which changes in some degree the objective conditions under which experience are had" [J. Dewey, *Experience and education*,

http://www.schoolofeducators.com/wp-content/uploads/2011/12/EXPERIENCE-EDUCATION-JOHN-DEWEY.pdf, 1938/1997, p. 39]. For a believer, world, other human beings, and God is the mentioned active side of spiritual experience manifested in the body.

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