

Article

Is an Integrative Model of Neurotheology Possible?

Leandro M. Gaitán ^{1,*}  and Javier S. Castresana ² 

¹ School of Education and Psychology, University of Navarra, Campus Universitario, 31009 Pamplona, Spain
² Department of Biochemistry and Genetics, University of Navarra School of Sciences, 31008 Pamplona, Spain; jscastresana@unav.es
* Correspondence: lgaitan@unav.es; Tel: +34-948425600 (ext. 806703)

Abstract: This article examines the basic and dialogical models of neurotheology and suggests a third model based on the work of Aldous Huxley. In other words, this proposal is not limited to understanding this discipline as a mere pursuit of neural correlates or as a dialogue between neuroscience and theology. Instead, it is the search for an integrative understanding of religious experiences in which the study of neuronal correlates is only one of the multilevels to be integrated within the framework of a plural and conveniently articulated explanation of such phenomena. This model, which we call integrative neurotheology, hopes to achieve knowledge of religious experiences that includes a comprehensive range of disciplines. In order to update and give argumentative consistency to this model, we will use philosopher Sandra D. Mitchell's theory of integrative pluralism, which is a more epistemologically refined expression of Huxley's intuitions. We conclude that a comprehensive model is feasible although we are aware that this article cannot give answers to all the difficulties that this model possesses. Nevertheless, we expect to open up a new pathway in the studies of religious experience.

Keywords: Aldous Huxley; neurotheology; reductionism; integrative pluralism; Sandra Mitchell; expanded epistemology



Citation: Gaitán, Leandro M., and Javier S. Castresana. 2021. Is an Integrative Model of Neurotheology Possible? *Religions* 12: 277. <https://doi.org/10.3390/rel12040277>

Academic Editor: Hans Zollner

Received: 3 March 2021
Accepted: 12 April 2021
Published: 16 April 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

This article examines the two predominant conceptions of neurotheology since its emergence as a scientific discipline and suggests an alternative conception based on the work of the British writer Aldous Huxley. Indeed, neurotheology has been conceived, on the one hand, as one of the many subdisciplines that are included within the field of neuroscience and is limited to the study of the neural correlates of religious experiences. On the other hand, it has been conceived as an interdisciplinary knowledge that develops from the dialogue between neuroscience and theology. In neither of the two cases is the way in which Aldous Huxley conceives neurotheology taken into account, which in our opinion is particularly relevant since Huxley was the creator of the term and his works allow us to sketch a different model from the two already mentioned. Instead of studying religious experiences from a single discipline, or from the interaction between two disciplines, Huxley's proposal is oriented towards the search for integrative (multilevel) knowledge that articulates the knowledge acquired on those experiences in a broader spectrum of disciplines. That said, the objective of this work, although with the space limitations of an article, is to try to delineate Huxley's model and fill an important gap in the literature of this conflictive field of knowledge.

In order to achieve this goal, the article is structured as follows. First, it explains the two models of neurotheology already in force and analyzes the model suggested by Huxley, as well as its originality and its differences compared to the other two models. Second, he compares Huxley's proposal with the cognitive science of religion (CSR), trying to highlight the differences between the two ways of studying the religious phenomenon. Third, it places Huxley's integrative proposal in the context of the debate between the so-called two

cultures. Fourth, it describes the theory of integrative pluralism of the philosopher Sandra D. Mitchell and articulates it with the model of neurotheology suggested by Huxley in order to offer a more up-to-date and epistemologically robust view of this model.

We understand that a return to Huxley is fundamental because it implies a return to the source from which the idea of neurotheology arose. This is an underexplored source that may allow us to outline a more integrative and therefore ambitious model which, as we can imagine, is not free of gaps and inconsistencies. We are aware of this. Therefore, this paper does not claim to provide answers to all the questions or difficulties that the model may present. It merely aims to open up a new avenue in the study of religious experience and, ideally, to generate an edifying debate regarding its possibilities and its limits.

2. Models of Neurotheology

The origin of the term neurotheology is strictly literary and can be traced back to the work of the British writer Aldous Huxley. The first work in which the author suggests the creation of this discipline is his 1923 novel *Antic Hay*. In this work one of the characters asks: But if theology and theosophy, then why not theography and theometry, why not theognomy, theotrophy, theotomy, theogamy? Why not theophysics and theochemistry? Several years later, in the novel *Island* (Huxley 1962), Huxley will refer explicitly to neurotheology.

In 1970, the Nobel Prize winner Francis Crick (1970) published in *Nature* an article titled “Molecular Biology in the Year 2000”. In such an article Crick suggests the development of a new research field called “biochemical theology”. In Crick’s opinion, this new field should address the study, for instance, of the efficacy of prayer. After that, it was James Ashbrook who, in the 1980s, began to use the term neurotheology for strictly scientific purposes. According to Ashbrook (1984), neurotheology is defined, in general terms, as the attempt to find out whether a specific God spot in the brain exists.

With Ashbrook’s works, neurotheology seemed to be presented as one more interdisciplinary science among others that have emerged in the last decades, given the need to deal with new problems that exceeded the scope of the traditional disciplines, which were methodologically limited to face such challenges. Its name should come as no surprise at all, just as we are not surprised to hear of bioinformatics, psycholinguistics and paleoanthropology, or even more, of neuroeducation, neurolaw, and neuroethics, just to mention a few of the many recently emerged hybrid sciences both within and outside the field of neuroscience (Gaitán 2012).

From the 1980s onward, two models have prevailed in neurotheology. The first one, perhaps the most widespread and accepted, hopes to find correlations between experiences typified as religious and the structures/functions of the brain (Runehov 2007). There are two clearly defined trends in this model, which we call *basic neurotheology*. One consists of studying such correlations with the intention of providing a new perspective about religious experiences but accepting the limits of the methodology used. It is a tendency that shuns all reductionism, attributing a cooperative character to its studies—that is, it is complementary to the research carried out in other fields of knowledge such as psychology, ethology, anthropology, phenomenology, and theology. Appealing to a sort of “methodological agnosticism” this approach emulates phenomenological theories insofar as researchers seem to bracket their ontological views (in this case, whether God is a product of the brain or an extramental reality). They merely describe the causal explanations of the subjects they study (Asprem and Taves 2018). The work of the Canadians Mario Beauregard and Vincent Paquette (Beauregard and Paquette 2006) is a good example of this take.

The second tendency, on the contrary, is impregnated with scientific presuppositions, and aims at providing a comprehensive explanation of religious experiences and behaviors in strictly neuroscientific terms, identifying the cerebral phenomena with the totality of aspects that such experiences and behaviors include (Shukla et al. 2013). Those who assume this position agree to an ontological reductionism and wish to prove that religiosity is a material phenomenon, inferring, thus, that God is but a product of the brain. Matthew

Alper is bold in his comments on this issue: “[f]or the first time in our species’ history, we possess a rational explanation of God. For the first time, we can justifiably dismiss our old religious and metaphysical paradigms as delusional impediments to progress and prosperity. Nietzsche may have hypothesized that God is dead, but science just confirmed it” (Alper 2006, p. 246). This reductive or naturalistic causal theory of explanation (Asprem and Taves 2018) seems to have managed to win over public opinion in recent decades, being presented as the result of the most rigorous neuroscientific theory and praxis, but which, we hold, is more ideology than neuroscience. Well-known examples of this trend within neurotheology are the works of neuroscientists Michael Persinger (1983) and Vilayanur Ramachandran (Ramachandran and Blakeslee 1998).

For the German theologian Michael Blume this neurological model “tends today to its end, since research teams have long adopted a more interdisciplinary dimension On the other hand, at present neuroscientists appear in the media less as ‘substitute theologians’ and more as researchers working in collaboration with authentic theologians” (Blume 2012, p. 92, our translation). Blume’s opinion seems to respond more to a desire than to a verifiable phenomenon. Neuroscientificism is booming, and at this rate, it is likely that a considerable amount of time will have to elapse before unfiltered optimism wears off and epistemological sanity begins to prevail. Having made the distinction between the two tendencies, it only remains to add that, in general, basic neurotheology is subordinate to neuroscience, since the latter covers a broader range of themes and disciplines.

The American neuroscientist Andrew Newberg offers a second model of neurotheology in his much-commented book *Principles of Neurotheology* (Newberg 2010). This model, which we suggest calling *dialogic*, proposes an epistemically balanced relation between neuroscience and theology. It is not a top-down model centered on neuroscience and in which theology lacks any relevance, but a model in which both areas of knowledge work together. In fact, from the first chapter of *Principles*, Newberg holds that neurotheology must be built on the search of a mutual enrichment between neuroscience and theology: “This book will also have the purpose of facilitating a sharing of ideas and concepts across the boundary between science and religion. Such a dialogue can be considered a constructive approach that informs both perspectives by enriching the understanding of both science and religion” (Newberg 2010, p. 2).

A little further ahead, analyzing the *raison d’être* of neurotheology as a new field of research, Newberg states what, in his opinion, constitutes the four foundational objectives of neurotheology (two theoretical and two practical): “(1) to improve our understanding of the human mind and brain¹; (2) to improve our understanding of religion and theology²; (3) to improve the human condition, particularly in the context of health and well being³; (4) to improve the human condition, particularly in the context of religion and spirituality⁴” (Newberg 2010, p. 18). Subsequently, he formulates a series of fifty-four principles that, in his opinion, should govern neurotheological research. Fourteen of these principles refer to the way neuroscience and theology should relate.

Newberg remarks that neurotheology is an extensive field of research, since no question or theological problem is beyond its reach. Still, he admits that not all theological topics are to be examined in the same way: neurotheology could only contribute superficially to some, while it could offer substantial information to others. Nevertheless, neurotheology could say something about topics such as (a) whether God’s existence could be proved; (b) God’s nature; (c) the nature of good and evil and how they relate to sin, freedom, and

¹ This goal indicates that neurotheology can offer valuable elements for the improvement of the methods of cognitive neuroscience, as well as new perspectives for the study of mental processes such as morality, love, honesty, and complex behaviors (2010).

² This goal refers to the study of the neurophysiological correlates of theological ideas and their potential to improve theology (2010).

³ At this point, Newberg especially refers to two questions: the first regarding the improvement of physical and mental health by means of stress reduction, and the general health of the population through medical interventions; and the second one in reference to a contribution to the problem of terrorism by gaining insight into the terrorist’s mind and evaluating what kind of individuals are more likely blindly to obey certain extremist religious doctrines, in order to offer, at least, methods for an appropriate redirection of their behaviors (2010).

⁴ This goal has to do with the promotion of understanding and tolerance of the religious phenomenon—already implicit in neurotheology (2010).

virtue; (d) the nature of spiritual revelation; (e) whether God is immanent to the universe; (f) the nature of the relationship between God and human beings; (g) whether there is a soul; and (h) whether and how it is possible to achieve salvation (Newberg 2010). Newberg raises a legitimate concern. He does not insist on responding only from a particular science but from a dialogic approach. Similar to this is the work of William R. Klemm. This author proposes an interrelationship between neuroscience, mental health, and religion, to which he calls “a triune worldview” (Klemm 2019, p. 9): “[n]euroscience provides the understanding and therapeutic tools to promote healthy minds. In turn, religions help identify moral and theological issues that could benefit from a better understanding of brain health and mental function” (Klemm 2019, p. 15). However, neither Newberg nor Klemm call upon specialists from other fields who could also make substantial contributions to the understanding of the religious phenomenon. That is precisely the model that Huxley suggests in his work and which we will develop below.

This third model, which we will call *integrative neurotheology*, seeks knowledge that articulates, in the most cohesive way possible, a broad spectrum of disciplines around a specific object of study: religious experiences and other phenomena directly related to them (for instance, glossolalia, trance states, and pharmacologically induced experiences, among others). It is an interdisciplinary neurotheology, more complex than the two previous models in epistemological, methodological and linguistic terms, and more protected against all forms of reductionism (methodological and, especially, ontological). Swedish theologian Anne Runehov, commenting on Newberg’s model, says that if he extended his model “by adding to it the expertise of, for example, sociologists, theologians, philosophers of religion and psychologists, they would have an exploratory model that even if it adopts methodological reduction, will avoid hasty reductive conclusions. In my view such a model could be fruitful for broadening the understanding of religious experiences, even if the religious experiences that can currently be studied by neuroscience are limited” (Runehov 2007, p. 225).⁵

3. A Huxleyan Integrative Neurotheology

We think that Huxley’s proposal sets a valuable precedent for the Runehov’s thesis. This is why it deserves to be examined. Certainly, his references to neurotheology, which amount to no more than two, are very short in explanatory terms. In our view, a careful reading of his essays, novels, letters and notes; however, allows us to outline a satisfactorily clear explanation of his characteristics. For the English writer, far from aiming at naturalizing religion by incurring into an ontologically and epistemologically objectionable reductionism, neurotheology should become a broader science—that is, a discipline that starts from the a priori knowledge that human beings are a cognitively inexhaustible reality. How, then, should neurotheology be understood in a Huxleyan key? We would argue that neurotheology is the attempt to articulate, in a shared and consistent discourse (in a kind of *lingua franca*), the results of research conducted across the range of disciplines that study religious experiences, and that, therefore, cover the main levels, from the neuro level to the theological-mystical one.

In his latest book titled *Literature and Science* (Huxley 2000–2002, V.6), Huxley suggests a study of these characteristics in relation to human nature. He declares that a genuinely scientific hypothesis about human nature is not attractive because it is scientific, but because it refuses to oversimplify it, insisting on doing justice to the different

⁵ Actually, Runehov’s quotation was said before Newberg published his book *Principles of Neurotheology*, in which he suggests an open dialogical neurotheology model, towards which Newberg seems to have evolved in the time that separates his first investigations with d’Aquili (by the end of the 1990s and the early 2000s), until the publication of his *Principles*, in the year 2010. Reading into Newberg’s early claims, Runehov affirmed that “[i]t was concluded that Newberg and d’Aquili explain religious experiences according to methodological reductionism. This means that religious experiences are reduced into neural activity for a specific purpose, but that Newberg and d’Aquili do not claim that their explanations exhaustively explain religious experiences; on the contrary” (224). For Runehov, Newberg and d’Aquili’s model of neurotheology in his early investigations would be much closer to what we define here as the first model (*basic neurotheology*), than to the second model (the *dialogical one*, which Newberg suggested in 2010). In addition to the possible changes in Newberg’s model’s for neurotheology, we want to highlight the closeness between Runehov’s proposal and that which emerges from Huxley’s work.

dimensions of an extremely complex reality. For Huxley, indeed, an authentically scientific anthropology will include literature, metaphysics and theology, as well as physiology, biochemistry, experimental psychology, the social sciences, and anthropology. Thus, religious experiences, insofar as they constitute a fundamental component of the human condition, should not be left out of that complexity principle.

In this sense, Laura Archera, Huxley's second wife, refers to some notes in which he affirms that religious experience can be explained in different languages, both subjective and objective, such as the language of psychology, biochemistry, neurophysiology, and theology. The ultimate aim would be to find a broader frame of reference in which these explanations can be combined. In other words, the ultimate aim would be to seek a *lingua franca* into which those different "dialects" can be translated (Archera 1969).

Even if Huxley finds the development of that *lingua franca* extremely difficult, his basic idea highlights the epistemic necessity for a robustly integrated explanation of the different disciplines that study religious experiences. Following French epistemologist Émile Meyerson, Huxley argues that the human being achieves a deep satisfaction when he succeeds in reducing the multiplicity of knowledge to a rational and comprehensive unity. In Huxley's opinion, this is a fundamental psychological fact. This is why we should intend to seek a sort of integrative knowledge of phenomena—in this case, the religious experience. This endeavor should be present in the scientific agenda although it can never be fully achieved.

That said, Huxley's model of neurotheology, contrary to Newberg's, comprises a much narrower range of problems. While the integrative model only focuses on problems related to religious experiences, the dialogical model, as we explained, is open to all theological problems. The question, then, concerns the feasibility of each of these models.

Newberg's neurotheological program is extremely comprehensive in terms of its object of study and, therefore, seems inapplicable. It is not easy to guess what kind of information neuroscience can offer to the study, for example, of the resurrection, the Parousia, or the sacrament of confirmation (just to cite some Christian examples; the question becomes even more complex when seeking to apply neuroscience to the elucidation of theological issues that are typical to other traditions). Newberg's model seems, thus, to rest on an excessive confidence with respect to the possibilities of neuroscience; a confidence that is difficult to justify in epistemological and methodological terms. On the contrary, it does seem possible to study religious experiences (regardless of the cultural, social, geographical, and doctrinal framework in which they are experienced), appealing to different methods and approaches.

Integrative neurotheology, instead, has a certain family resemblance with cognitive science, in terms of its structure and its purposes. Cognitive science, in fact, is based on the search for a totalizing understanding of knowledge considered *per se* and includes both empirical and theoretical approaches. Francisco Varela (1990) expresses how fascinating cognitive science is precisely because it combines points of view that come from distant sources such as computer engineering and philosophy. Something similar could be said of integrative neurotheology, since it also seeks to become a symphonic discipline, but it is focused on religious experiences and phenomena associated with them. This integrative model, akin to any new field of research, has to face important challenges that can only be overcome with a long period of interdisciplinary dialogue.

4. Integrative Neurotheology and Cognitive Science of Religion

Now, if it is possible to find certain isomorphisms between cognitive science and integrative neurotheology, then what is the point of it if cognitive science of religion (CSR) seems to have already achieved its goal? Why create, then, a new model of neurotheology? CSR was initially founded "in order to formulate new theories about a wide range of religious materials, including religious ritual, religious representations, and modes of religiosity" (McCauley and Whitehouse 2005). In a second stage, investigations were developed to analyze the consequences of these theories and to test additional cognitive

theories—for example, about the connections between religion and morality, and the nature of theology (McCauley and Whitehouse 2005).

In his article *Cognitive Science of Religion* (Barrett 2013), Justin Barrett defines CSR as a field of research that seeks to explain the repetition of religious beliefs and practices in causal terms, as well as the role they play in social and political agreements. At present, even though CSR has generated an abundant number of consistent theories in relation to these issues, it has systematically left aside a multiplicity of aspects of religious experiences. CSR, in fact, focuses particularly on issues concerning the origin of religion (the origin of its beliefs and its external manifestations), and its impact on socio-political organizations. It is quite evident from its agenda, then, that the study of the nature of religious experiences is not a priority, which is precisely the cognitive gap that neurotheology comes to complete, adding to its reflection the theological aspect that CSR, at least its *standard model*, lacks.⁶

CSR's *standard model* postulates that religion is a by-product of cognitive adaptations that occurred during the evolutionary history of human beings. In this sense, religious cognition is considered parasitic with respect to ordinary cognitive functions, while religious concepts are considered to be counterintuitive—i.e., concepts that challenge our ordinary way of conceiving reality. Moreover, some advocates of the standard model argue that “any theological explanation of religious belief is invalidated through the process of epistemological reduction. Thus, the real explanation for religious beliefs is at the level of cognitive and evolutionary science, not higher-level descriptions offered by religious studies or theology” (Van Slyke 2011, p. 12). Van Slyke adds that, due to the absence of a clear demarcation between metaphysical and scientific propositions, the standard model has been subjected to numerous criticisms (Horvat and Roszak 2020; Day 2005; Hinde 2005).

As an example, one could consider the existence of God. The metaphysical propositions about God's existence or nonexistence are essentially multileveled, meaning that they are supported by arguments coming from multiple disciplines and not only from empirical evidence that can only offer a single level of discourse. Thus, CSR's evidence is not sufficient to eliminate the theological explanation of religious beliefs (Van Slyke 2011, p. 13). Based on this criticism, some scholars (Van Slyke 2011; Oviedo 2008; Brelsford 2005) have suggested the development of a more inclusive CSR, in which theological discourse is included. Despite these suggestions, the trend still continues, tipping the balance in favor of the reductionist approach. In short, considering CSR in global terms, and comparing it with the integrative neurotheology with Huxleyan roots, the difference between both in relation to the role of religious studies and theology is very significant.

The inclusion of these approaches does not imply for the Huxleyan model the substitution of the naturalist method for explanations that appeal to supernatural causes. Still, our suggestion is to take into account the explanations of those for whom such experiences are not justified in purely subjective-immanent terms, as they experience these phenomena on the assumption that they experience an extramental reality, which is therefore independent of the subject of experience. The interest in integrating the theological discourse in the context of a multilevel explanation is far from substituting naturalistic explanations for supernatural ones. On the contrary, it is an effort to adopt an integrative view of religious experience, without marginalizing any approach (we particularly refer to theology⁷) or subordinating them to each other.

The final and most important question, to which we will turn in the next sections, remains: how could science's discourse be articulated with the humanities', and theology's in particular, as to reinforce the integrative model of neurotheology?

⁶ Some authors propose integrating the study of religious experiences into CSR (see Taves and Asprem 2017). However, this proposal does not yet seem to have been widely accepted. In case this happens, religious experiences would be studied from the theoretical framework of CSR, which could provide a new and interesting approach to integrative neurotheology.

⁷ Theology consists in the application of philosophical and even scientific rationality for studying religious phenomena. This is why it should not be excluded from an integrative research of religious experience.

5. Integrative Pluralism and the Problem of the Two Cultures

A strong controversy between natural sciences and humanities took place during the 1950s, in which both sides seemed to compete for disciplinary supremacy. In a famous lecture, physicist and writer Charles Percy Snow used the *two cultures* metaphor to refer to this confrontation (Snow 1959). Today, this confrontation seems far from being solved.⁸ The American physicist and mathematician Alan Sokal bluntly states that the humanities and the natural sciences are probably more separated today than in any other period of the last fifty years (Sokal 2009, pp. 127–28). This phenomenon reveals the relevance of the Huxleyan approach and invites us, half a century later, to reread and resignify it in the light of the circumstances that characterize our time. The first model of neurotheology we presented earlier (reductionist neurotheology) is a clear example of the hiatus between the world of the humanities and that of the natural sciences.

Neuroscientists such as Persinger and Ramachandran (or Muramoto 2004; Gazzaniga 2005) would agree with this position, identifying methodological and ontological naturalism, and have spoken in terms that we would call neuroscientific expansionism. A typical example is Michael Persinger, who claims that “[m]ystical and religious experiences are hypothesized to be evoked by transient, electrical microseizures within deep structures of the temporal lobe” (Persinger 1983, p. 1255). In these reductionist neurotheological circles there are at least two main arguments that lead to the conclusion that the brain creates God: (1) the existence of specific correlates in the brain; and (2) the alleged evidence that religious experiences can be provoked by electrically stimulating specific areas of the brain. In reaction to these arguments, some specialists with backgrounds in humanities (and also in sciences) have objected to the value of these investigations and have rejected reductionism in neurotheology (for example, Anne L. C. Runehov 2007; Matthew Ratcliffe 2006; and Nancey Murphy 1998, among others).

Huxley enlightens this controversial issue stating that “[i]t is these three worlds—the world of abstractions and concepts, the world of immediate experience and objective observation, and the world of spiritual insight—which must, in any integrated point of view, be brought together [. . .] The trouble with all specialized knowledge is that it is an organized series of celibacies [celibacies of the intellect]. The different subjects live in their monastic cells, apart from one another, and simply do not intermarry and produce the children that they ought to produce. The problem is to try to arrange marriages between these various subjects, in the hope of producing a valuable progeny” (Huxley 1994, pp. 5–6). This statement could serve as a framework to characterize interdisciplinary research. If one takes into account that Huxley wrote these words in a cultural context of strong fragmentation between the humanities and the sciences, his intuition is not only correct, but also transgressive; however, it is even more transgressive at present, since even if the discourse of the interdisciplinarity is widely accepted in academic circles, the gap between the two cultures seems to expand more and more.

The multiplication of subdisciplines and the technological development, in addition to an intellectual attitude closer to *hybris* (arrogance) than to *sophrosyne* (sobriety), crystallizes in totalizing ambitions that lead to the establishment of unproductive hierarchies of power and authoritarianisms; authoritarianisms that, in Huxley’s language, exalt the “celibacy of the intellect” against any attempt at marriage conciliation—that is, against any dialogical, democratic (or uniform in terms of authority), dynamic, and real interdisciplinarity. These totalizing ambitions were manifest in the past in areas such as physics and genetics, but they are currently detected more clearly in neuroscience.

Of course, the prevailing view is that interdisciplinarity is an accomplished fact, a tangible reality in front of which it is no longer possible to go backwards. Neuroscience is thus the result of the convergence and healthy coexistence of different areas of scientific

⁸ The *two cultures* problem was mainly due to the ontological, epistemological, and methodological scientism promoted by the Vienna Circle and the philosophical movement known as logical positivism—or logical empiricism—that was beginning to gain weight overwhelmingly in philosophy departments at Anglo-Saxon universities.

knowledge: anatomy, embryology, biochemistry, physiology, neurology, and pharmacology, among others. It is undeniable, then, that interdisciplinarity within the natural sciences is widely practiced today. It seems, however, that disciplines such as neuroaesthetics, neurophilosophy, neuroethics, and, of course, neurotheology demand a pairing not only among the different natural sciences, but also between the natural sciences and the humanities, which is certainly a more difficult task (Sanguineti 2018). We argue that neuroscience has a universal and multidisciplinary vocation, which crosses the departmental borders and aspires to the consilience between sciences and humanities. Nevertheless, as sociological studies seem to testify (Reiner 2011; McCabe and Castel 2008; Weisberg et al. 2008), the predominant conception, both in the scientific community and public opinion, gives primacy to the discourse of neuroscience over other disciplines.

6. An Expanded Epistemology for an Integrative Neurotheology

In this regard, Huxley provides a set of general ideas that openly oppose any domination attempt of the natural sciences over the humanities. These ideas, however, are not presented as an epistemological model of clearly defined multidisciplinary integration within Huxley's works. American philosopher Sandra D. Mitchell has produced some recent work on the matter, which may help to develop Huxley's ideas and intuitions. Mitchell develops, in effect, a nonreductionist epistemological model that is worth considering in neurotheological research to better interweave the three worlds to which Huxley referred. In her book *Unsimple Truths* (Mitchell 2009), Mitchell advances an *integrative pluralism*, which intends to overcome reductionist approaches. Reductionism, she explains, is characterized by the search for fundamental laws and clean and clear causal interactions, producing good results between the sixteenth century and the first decades of the twentieth centuries. This strategy, however, cannot be applied to the study of phenomena in which uncertainty and disorder affect causal relationships, such as genes and phenotypes, human interventions on the environment, psychiatric pathologies, and, one might also add, religious experiences, among others.

For Mitchell, the traditional notion of controlled experimentation can fail in the study of phenomena with complex structures. Thus, the search for a scientific method and some small set of fundamental laws that explain everything, in every place, must be replaced by a more pluralistic and pragmatic approach to scientific work, reminding us of Huxley's words: "[w]e shall never deal effectively with our human problems until we [. . .] temper our longing for rational simplification by the recognition in things and events of a certain residue of irrationality, diversity, and specificity" (Huxley 2000–2002, V.4: 337).

In this same spirit, Mitchell suggests seeking for "an expansion of traditional epistemologies of science to accommodate aspects of knowledge that do not fit the older formulations" (Mitchell 2009, p. 4). To illustrate this idea, she examines one of the most common psychiatric illnesses, depressive disorder, and specifically clinical depression—that is, that type of depression that does not arise from some tragic event in life, such as the loss of a loved one, but a complex network of chemical, biological, neurological, neuroanatomical, and psychological processes. We consider that something similar can be said of religious experiences. These experiences cannot be repeated in different people, since their subjectivity plays a fundamental role, meaning that there are subjective elements completely out of control of scientific research. In addition, these experiences are essentially dynamic, which makes them, in a certain way, unpredictable. Finally, both their causes and effects involve an entire range of organizational levels. Mitchell concludes that "[t]he challenge of understanding how . . . many different small explanations fit together . . . is a challenge I believe confronts many different sciences in many different ways" (Mitchell 2009, p. 10).

Mitchell suggests, then, that an expanded epistemology should incorporate the following elements: (1) *pluralism*, articulating multiple methods and explanations at different levels of analysis, instead of looking for simple and reductive explanations at a lower level, as happens in classical epistemology; (2) *pragmatism* instead of absolutism or, following

Toulmin (2001), *democracy* instead of intellectual tyranny, recognizing that there are many types of certainty, degrees of generality and levels of abstraction through which to represent (albeit partially) the nature of the real; and (3) the *evolutionary and dynamic dimension of knowledge*, which requires finding new ways of studying nature and new strategies of managing knowledge (Mitchell 2009, p. 13).

As Mitchell points out, there are more types of things than fundamental physical particles. We could speak, within neurotheology, of more types of things than electrochemical functions, as Philip Clayton states in *Mind and Emergence. From Quantum to Consciousness*: “[t]o say that the human person is a psycho-somatic unity is to say that the person is a complexly patterned entity within the world, one with diverse sets of naturally occurring properties, each of which needs to be understood by a science appropriate to its own level of complexity. We need multiple layers of explanatory accounts because the human person is a physical, biological, psychological, and (we believe also) spiritual reality, and because these aspects of its reality, though interdependent, are not mutually reducible” (Clayton 2004, p. 148). The rejection of reductionism, thus, as the only way of studying all phenomena leads to the acceptance that only a multiplicity of representations can describe the different aspects of any given causal structure (Carril 2018). This idea is key for a neurotheology understood in Huxley’s terms. In a sense, religious experiences can only be represented integrally and cohesively if one manages to articulate in a convenient way the different explanations corresponding to the different disciplines that study them as the pieces of a puzzle. If Huxley’s and Mitchell’s suggestions were to be brought into scientific practice, we would take an enormous step in the search for a coherent entanglement between the natural sciences and the humanities; a step in which neurotheology could play a decisive and exemplary role.

In a cautionary note, Mitchell says that reduction in the natural sciences is neither always wrong nor always correct. Actually, reductionism becomes dangerous when it is thought of as the only methodological alternative—i.e., when it has universalist aspirations. On the contrary, pluralism recognizes the diversity of existing worldly causal structures. Still, Mitchell is of the idea that not all pluralisms are equal, not agreeing with Feyerabend’s *anything goes* pluralism, according to which all forms of argumentation are acceptable in science. Of course, Huxley would not subscribe to either. Pluralism does not suppose the abandonment of trust in scientific theories that are well-confirmed as representations of the world (Oleksowicz and Roszak 2021).

Another form of pluralism is Philip Kitcher’s moderate pluralism, which encourages the temporary plurality of rival theories until empirical evidence leans in favor of one theory over others. That is to say, for this form of pluralism the objective is to achieve a unified explanation. As Kitcher notes “[t]he community goal is to arrive at universal acceptance of the true theory” (quoted in Mitchell 2009, p. 108). This kind of moderate pluralism is, thus, a pluralistic methodology with a monistic goal, seeking to achieve a unified theory through the competition of theories. For Mitchell, the competition between mutually exclusive theories only describes one aspect of the scientific enterprise but does not account for the totality. In fact, against this form of pluralism, Mitchell points out that only a part of current scientific statements are rivals, while others are compatible and, for this reason, must be integrated into a multilevel explanation, an idea that is at the root of her integrative pluralism. Huxley would also be more agreeable to this kind of pluralism since, on the one hand, his commitment to rigorous scientific knowledge would not allow him to join Feyerabend’s relativist pluralism, and on the other, his preference for a holistic explanation of phenomena would not allow him to accompany the model of *the winner takes all*. His idea of science leads him to find a way to build bridges between the different organizational levels to achieve the most exhaustive possible explanation.

7. Concluding Remarks

Scientific explanation that attributes an explanatory and sufficient causal power to the fundamental properties of the most basic physical entities will always neglect higher level

causes that are an indispensable mechanism in the history of complex systems. A good example is that of depressive disorders, to which Mitchell affirms that there are multiple access roads: internal, external, and social factors in the life of affected individuals. In this sense, religious experiences require the same kind of approach, to which one should add the philosophical and theological-mystical dimensions. The results of different disciplines at different levels, however, are not algorithmically integrated—that is, there is not a single way to integrate them. Pluralism not only applies to causes and to different organizational levels, but also to the ways in which results are integrated.

Mitchell does admit that reductionist explanations of phenomena (which in the case of religious experiences would be limited to biochemical explanations) offer a simpler and less challenging panorama of science than integrative pluralism. This new approach “defines what Lakatos [. . .] called a ‘research program’ for both science and philosophy of science” (Mitchell 2009, p. 115), which seeks an expanded approach to epistemology to open new ways for a more complete understanding of our world. In short, Mitchell offers a research model that, even if it does not come without difficulties, faces the ontological pluralism of complex phenomena and adopts an epistemologically pragmatic attitude recognizing total authority to each of the disciplines within the margins in which they work. In addition, this approach highlights the importance of finding the points of convergence and integration among various theories, both among those belonging to the same ontological level, and those belonging to different levels.

Half a century after Huxley’s work, Sandra D. Mitchell seems to offer a philosophically sound expression to the English writer’s intuitions. The key to Huxley’s proposal for the development of neurotheology is discovered in his wish to build bridges between the humanities and the natural sciences. This proposal is neither limited to understanding this discipline as a mere search for neural correlates, nor as a mere dialogue between neuroscience and theology, but as the search for an integrating understanding of religious experiences, in which the study of neuronal correlates is only one of the multiple levels that need to be integrated within the framework of a plural explanation (scientific and humanistic).

Author Contributions: Conceptualization, L.M.G.; methodology, L.M.G.; investigation, L.M.G.; writing—original draft, L.M.G.; funding acquisition, J.S.C.; writing—review and editing, L.M.G. and J.S.C. All authors have read and agreed to the published version of the manuscript.

Funding: Fundación Universidad de Navarra grant number 2018/2021.

Conflicts of Interest: The authors declare no conflict of interest.

References

- Alper, Matthew. 2006. *The “God” Part of the Brain: A Scientific Interpretation of Human Spirituality and God*. Naperville: Sourcebooks. Naperville: Sourcebooks.
- Archera, Laura. 1969. *This Timeless Moment. A Personal View of Aldous Huxley*. London: Chatto & Windus.
- Ashbrook, James. 1984. Neurotheology: The Working Brain and the Work of Theology. *Zygon* 19: 331–50.
- Asprem, Egil, and Ann Taves. 2018. Explanation and the Study of Religion. In *Method Today. Redescrining Approaches to the Study of Religion*. Edited by B. Stoddard. London: Equinox, pp. 133–57.
- Barrett, Justin. 2013. Cognitive Science of Religion. In *Encyclopedia of Sciences and Religions*. Edited by A. L. Runehov and L. Oviedo. Dordrech: Springer, pp. 409–12.
- Beauregard, Mario, and Vincent Paquette. 2006. Neural Correlates of a Mystical Experience in Carmelite Nuns. *Neuroscience Letters* 405: 186–90. [[CrossRef](#)] [[PubMed](#)]
- Blume, Michael. 2012. Tres décadas de neuroteología. *Mente y Cerebro* 57: 89–92.
- Brelsford, Theodore. 2005. Lessons for Religious Education from Cognitive Science of Religion. *Religious Education* 100: 174–91. [[CrossRef](#)]
- Carril, Ignacio Enrique. 2018. La física cuántica y el diálogo con la religión. *Scientia et Fides* 6: 9–29. [[CrossRef](#)]
- Clayton, Philip. 2004. *Mind & Emergence. From Quantum to Consciousness*. New York: Oxford University Press.
- Crick, Francis. 1970. Molecular Biology in the Year 2000. *Nature* 228: 613–15. [[CrossRef](#)] [[PubMed](#)]

- Day, Matthew. 2005. Rethinking Naturalness: Modes of Religiosity and Religion in the Round. In *Mind and Religion: Psychological and Cognitive Foundations of Religiosity*. Edited by Harvey Whitehouse and Robert N. McCauley. Walnut Creek: AltaMira Press, pp. 85–106.
- Gaitán, Leandro. 2012. Puede la neuroteología ser considerada una disciplina científica? *Stoa* 3: 5–29.
- Gazzaniga, Michael. 2005. *The Ethical Brain*. New York: Dana Press.
- Hinde, Robert A. 2005. Modes Theory: Some Theoretical Considerations. In *Mind and Religion: Psychological and Cognitive Foundations of Religiosity*. Edited by Harvey Whitehouse and Robert N. McCauley. Walnut Creek: AltaMira Press, pp. 31–55.
- Horvat, Sasa, and Piotr Roszak. 2020. Is religion only utilitarian? Evolutionary cognitive science of religion through a Thomistic lens. *Theology and Science* 3: 475–89. [\[CrossRef\]](#)
- Huxley, Aldous. 1962. *Island*. New York: Harper & Row.
- Huxley, Aldous. 1994. *The Human Situation*. London: HarperCollins.
- Huxley, Aldous. 2000–2002. *Complete Essays*. Edited by Robert Baker and James Sexton. Chicago: Ivan R. Dee, vol. I–VI.
- Klemm, William R. 2019. Whither Neurotheology? *Religions* 10: 634. [\[CrossRef\]](#)
- McCabe, David, and Alan Castel. 2008. Seeing is believing: The effect of brain images on judgments of scientific reasoning. *Cognition* 107: 343–52. [\[CrossRef\]](#)
- McCauley, Robert N., and Harvey Whitehouse. 2005. Introduction: New Frontiers in the Cognitive Science of Religion. *Journal of Cognition and Culture* 5: 1–13.
- Mitchell, Sandra D. 2009. *Unsimple Truths. Science, Complexity and Policy*. Chicago and London: University of Chicago Press.
- Muramoto, Osamu. 2004. The role of the medial prefrontal cortex in human religious activity. *Medical Hypotheses* 62: 479–85. [\[CrossRef\]](#) [\[PubMed\]](#)
- Murphy, Nancey. 1998. Nonreductive Physicalism: Philosophical Issues. In *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*. Edited by Warren S. Brown, Nancey Murphy and H. Newton Malony. Minneapolis: Fortress Press, pp. 127–48.
- Newberg, Andrew B. 2010. *Principles of Neurotheology*. Farnham and Burlington: Ashgate.
- Oleksowicz, Michał, and Piotr Roszak. 2021. Plurality as epistemic good. Theological Explanation in Science-Religion Debate. *Journal for the Study of Religions and Ideologies* 20: 81–95.
- Oviedo, Lluís. 2008. Is a Complete Biocognitive Account of Religion Feasible? *Zygon* 43: 103–26. [\[CrossRef\]](#)
- Persinger, Michael. 1983. Religious and Mystical Experiences as Artefacts of Temporal Lobe Function. A General Hypothesis. *Perceptual and Motor Skills* 57: 1255–62. [\[CrossRef\]](#) [\[PubMed\]](#)
- Ramachandran, Vilayanur S., and Sandra Blakeslee. 1998. *Phantoms in the Brain. Probing the Mysteries of the Human Mind*. New York: William Morrow.
- Ratcliffe, Matthew. 2006. Neurotheology: A science of what? In *Where God and Science Meet: How Brain and Evolutionary Studies Alter Our Understanding of Religion*. Edited by Patrick McNamara. The Neurology of Religious Experience. Westport and London: Praeger Publishers, vol. 2, pp. 81–104.
- Reiner, Peter. 2011. The Rise of Neuroessentialism. In *The Oxford Handbook of Neuroethics*. Edited by Judy Illes and Barbara J. Sahakian. Oxford: Oxford University Press, pp. 161–75.
- Runehov, Anne L. 2007. Sacred or Neural? The Potential of Neuroscience to Explain Religious Experience. Göttingen: Vandenhoeck & Ruprecht.
- Sanguineti, Juan José. 2018. La relevancia de la neurociencia en el estudio de la religiosidad. *Scientia et Fides* 6: 85–99. [\[CrossRef\]](#)
- Shukla, Samarth, Sourya Acharya, and Devendra Rajput. 2013. Neurotheology-Matters of the Mind or Matters that Mind? *Journal of Clinical and Diagnostic Research* 7: 1486–90. [\[CrossRef\]](#)
- Snow, Charles P. 1959. *The Two Cultures and the Scientific Revolution*. Cambridge: Cambridge University Press.
- Sokal, Alan. 2009. *Beyond the Hoax: Science, Philosophy and Culture*. Oxford: OUP.
- Taves, Ann, and Egil Asprem. 2017. Experience as Event: Event Cognition and the Study of (Religious) Experiences. *Religion, Brain, & Behavior* 7: 43–62.
- Toulmin, Stephen. 2001. *Return to Reason*. Boston: Harvard University Press.
- Van Slyke, James A. 2011. *The Cognitive Science of Religion*. Farnham and Burlington: Ashgate.
- Varela, Francisco J. 1990. *Conocer. Las Ciencias Cognitivas: Tendencias y Perspectivas*. Cartografía de las Ideas Actuales. Barcelona: Gedisa.
- Weisberg, Deena S., Frank C. Keil, Joshua Goodstein, Elizabeth Rawson, and Jeremy R. Gray. 2008. The Seductive Allure of Neuroscience Explanations. *Journal of Cognitive Neuroscience* 20: 470–77. [\[CrossRef\]](#) [\[PubMed\]](#)