

Article

The Expansion of Consciousness during Mystical Experiences: The Example of Moses

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Abstract: What happens in the brain during meditation? Neuroscientists such as Andrew Newberg, who studies religious experiences on the neural level, may provide an answer. He calls the devolution, which is similar to all mystical experiences in different faiths, self-transcendent experience (STE); in a further instance, he also calls it the feeling of Absolute Unitary Being (AUB). A more detailed consideration of related issues is done by examining the human expansion of consciousness in Islamic mysticism based on an event depicted in the Qur’ān, namely Moses’ desire to talk to or see God, his subsequent unconsciousness due to the awe of God, and his subsequent attainment of a new consciousness. The following paper will have a brief look at the case of Moses and aims to investigate the states of consciousness during such experiences. Here, an attempt will be made to trace and prove a connection between neuroscience and the mystical state of the feeling of union with God. In doing so, particular attention will be paid to the state of the encounter between Moses and God. From a neuropsychological point of view, the question will be investigated whether the special spiritual experiences such as those of Moses can be measured, and within this framework, different consciousness models will be presented. Can Newberg’s STE or AUB theory be regarded equally with the *fanā’* state? Finally, which kind of psychological experience is applicable to Moses will be examined.

Keywords: consciousness; AUB; religious experience; Moses



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[. . .] we can experience union with something larger than ourselves and in that union find our greatest peace. (James 1902)

1. Introduction

This paper will address consciousness and religious experiences, a topic situated in the interdisciplinary field of research in which theses of philosophy of religion are discussed in connection to findings from the natural sciences. First, this article will give a brief historical overview of the connection between neuroscience and religion. The two are only seemingly distant from each other; on closer examination, questions from one field raise questions in the other so that they refer to each other and not infrequently lead to mutual questions about human life and meaning. An underlying premise of this article is that consciousness is the connection between religion and natural science, for it is the brain that communicates with God by reading holy scriptures and saying prayers (Newberg 2010). Whereas consciousness is a topic of research in religion as well as in contemporary philosophy of the mind, the brain is described in more detail in the natural sciences. These scientific fields can mutually benefit from each other’s findings. Werner Heisenberg is credited with the following quote describing the relationship between religion and the natural sciences: “The first drink from the cup of the natural sciences makes one atheistic, but God then appears at the bottom of the cup.”¹

In the following pages, an attempt is made to look at the ideas of the ‘I’ in terms of consciousness theory. What constitutes the core or the soul of the human being can neither be answered by the science of psychology nor neuroscience, since this question

does not fall within their fields of research. However, at present, numerous scientists in neurotheology see a connection between religion and modern natural sciences. For example, the psychologist and neurologist Vilayanur Ramachandran as well as Sandra Blakeslee talk about a ‘God module’ in the brain that shows increased activity during religious practices (Ramachandran and Blakeslee 1999). Furthermore, neurophysiologists such as John Eccles take the existence of the soul and its survival after death for granted. Eccles justifies this conviction by an indeterministic world view, which is supported by modern quantum physics (Popper and Eccles 1994). Most neuroscientists, on the other hand, seem to follow a deterministic materialism.² Many of these materialist neuroscientists, such as Gerhard Roth, deny the existence of the soul; they hold that humans can be explained by physical processes alone and that the so-called mind is merely an interconnectedness of various neuronal areas (Roth and Strüber 2019). Finally, numerous modern scientists ascribe to the idea of an existence of the soul or an existing consciousness without representing a classical substance-dualistic point of view.

Others accept such dualism. Thus, the research of neuropsychiatrist and neurophysiologist Peter Fenwick focuses on near-death experiences (Fenwick 2008). He believes that human consciousness can continue to exist after the death of the body. According to Fenwick, consciousness is not created by the brain, but the brain filters consciousness. For this reason, he argues, the brain can also create a false idea of our self, so that humans can only have a pure and full consciousness after death (Lazarus 2019). This idea is in line with the thesis of this article, which is that consciousness continues to exist and will expand after death, and can even be expanded during a person’s lifetime. Fenwick assumes that we will only have a pure and full consciousness after death, a thesis which is also consistent with the theological teachings of Islam.³

2. Consciousness Research between Natural Science and Religion

The question of human consciousness is one that receives much attention in contemporary scientific and societal discourse. Within this debate, there are opposing positions that hold incompatible views on consciousness. To begin with, materialists reduce the mind or soul to physical processes in the brain or posit a theory of supervenience. While Daniel Dennett, for example, holds the materialist view that human consciousness is an illusion (Dennett 2017), other consciousness researchers are of the opinion that humans have a consciousness that must consist of more than just neurons. Among these researchers is the Australian philosopher and cognitive scientist David Chalmers, who describes consciousness as the greatest mystery and the greatest challenge to the sciences: “Consciousness is the biggest mystery. It may be the largest outstanding obstacle in our quest for a scientific understanding of the universe.” (Chalmers 1997, p. xi). According to Chalmers, consciousness is unique because of its simultaneous familiarity and intangibility:

Conscious experience is at once the most familiar thing in the world and the most mysterious. There is nothing we know about more directly than consciousness, but it is far from clear how to reconcile it with everything else we know. [. . .] [I]t is the most vivid of phenomena; nothing is more real to us (Ibid., p. 3).

Following Chalmers, there is nothing that is closer to the human being, but at the same time more mysterious, than our own consciousness. Our epistemological access to it is unlike that of anything else; as our own mental state, we cannot help but experience it as both immediate and entirely private, as something ‘inside’ us. However, as soon as we attempt to discuss it from a third-person perspective, we are confronted with numerous difficulties as it is simultaneously and unavoidably implicit in all of our experiences. As a fundamental mental state that has been proven to coincide with certain brain activities, consciousness’ ability to be located in the human brain or even observed is frequently questioned. In neurotheology research, some scientists locate it in the thalamus, which is described as the gateway of consciousness because its activity changes during the course of meditation (Pape et al. 2005). Consciousness is also commonly understood as subjective awareness of present events that are in the context of personal memories (John 2003).

But what needs to be clarified is whether the thalamus is the sole site of human consciousness and, of course, whether consciousness is a concept that can be identified with any particular brain area whatsoever. Neuroimaging is a first step towards an answer to this question: with the help of modern imaging techniques such as PET (positron emission tomography) or fMRI (functional magnetic resonance imaging), the neuronal areas in the brain that play a role in maintaining the state of consciousness can be seen. However, a concrete location in the brain as the seat of consciousness cannot be determined due to the complexity and interconnectedness of the neuronal structures. In general, therefore, consciousness research faces unique challenges:

The scientific study of consciousness is a challenging domain, not only because of the philosophical ‘hard’ problem involved [. . .], or the methodological difficulties in measuring or modelling consciousness [. . .], but also because the basic concepts in this field remain unclear (Revonsuo 2009).

Acknowledging these challenges, Chalmers distinguishes between two categories in consciousness research, namely research concerned with the hard problem of consciousness and the easy problem of consciousness (Chalmers 1995). The hard problem of consciousness deals with the question of how and why the complexity of consciousness arises; that is, of the neurophysiological scheme of the emergence of consciousness. Thus, Chalmers states: “The hardest part of the mind-body problem is the question: how could a physical system give rise to conscious experience?” (Chalmers 1995). This is about the category of qualia, which describes what a certain state is or feels like. Currently, there is no solution to the “hard problem” (Chalmers 1997).⁴

When we consider these issues while evaluating the case of Moses,⁵ it becomes clear that, if this explanation were followed, processes in the thalamus would have led to Moses’ unconsciousness. Before moving forward to the next section and speaking about the measurement of consciousness, here in the following is the encounter of Moses and God in the Qur’ān: “*wa-lammā jā’a Mūsā li-mīqātīnā wa-kallamahū rabbuhū qāla rabbi arinī anẓuru ilayka qāla lan tarānī wa-lākini nẓur ilā l-jabali fa-inī staqarra makānahū fa-sawfa tarānī fa-lammā tajallā rabbuhū li-l-jabali ja’alahū dakkān wa-kharra Mūsā ẓāqan fa-lammā afāqa qāla subhānaka tubtu ilayka wa-ana awwalu l-mu’minīna.*” When Moses came at the appointed time and his Lord spoke to him, he asked, “My Lord! Reveal Yourself to me so I may see You.” Allah answered, “You cannot see Me! But look at the mountain. If it remains firm in its place, only then will you see Me.” When his Lord appeared to the mountain, He levelled it to dust and Moses collapsed unconscious. When he recovered, he cried, “Glory be to You! I turn to You in repentance and I am the first of the believers.” (7:143).⁶

3. Measuring Consciousness

Although consciousness research is extraordinary and challenging, it is nevertheless possible to measure consciousness. In terms of answering the question of the proposed research, it is believed that focusing on what is called the “easy problem of consciousness” will prove more promising. The easy problem, as Chalmers describes it, can be summed up as the question of how certain cognitive activities, such as learning, are related to underlying brain activity. In this respect, neuroscience is making significant progress and has already explained how these activities are connected with neurological mechanisms and brain activity in certain areas.

Regarding the problem of consciousness, the Italian neuroscientist Giulio Tononi, one of the leading researchers in consciousness research, has developed a scientific method with which consciousness can be measured. His theory is called integrated information theory (IIT) and addresses the hard problem of consciousness from a new point of view. He does not ask *why* consciousness arises, but rather explores *how* it arises:

It does not start from the brain and ask how it could give rise to experience; instead, it starts from the essential phenomenal properties of experience, or axioms, and infers postulates about the characteristics that are required of its physical

substrate. Moreover, IIT presents a mathematical framework for evaluating the quality and quantity of consciousness (Tononi et al. 2016, p. 450).

IIT measures consciousness with phi (ϕ), which is the power or awareness that an entity has over itself and its environment. In measuring phi, “The axioms of IIT state that every experience exists intrinsically and is structured, specific, unitary and definite.” (Ibid., p. 450). The mathematical formula used to measure the consciousness of various entities will not be discussed in detail here, as it would exceed the scope of the project. Nevertheless, what is interesting for the present research question is the fact that, biologically speaking, humans (*homo sapiens*) have the highest degree of consciousness of all living beings due to the complexity of their brain structure and its neuronal interconnections. In a weakened form, according to IIT, other living beings, such as plants and animals, also have consciousness, but it is physiologically more simply structured (Tononi 2012). The Canadian psychiatrist Richard Maurice Bucke, who dealt with mystical experiences, also describes three categories of consciousness in his work *Cosmic Consciousness: A Study in the Evolution of the Human Mind*: the simple consciousness of animals, the self-consciousness of all humans and the cosmic consciousness, and the “only chosen one,” of enlightened people (Bucke 1905). According to Bucke, the salvation of man is to approach cosmic consciousness (Ibid.). In a similar vein, the neuroscientist Christof Koch understands IIT as a form of panpsychism. He believes that unlike classical panpsychism, physical objects do not have a phi that is different from zero. For example, sand or a black hole has a phi that is equal to zero because it has no consciousness and no mental properties (Koch 2014).⁷

With regard to the chosen example of Moses’ encounter with God, it would have to be asked, following IIT, what degree of phi or consciousness Moses possessed before his fainting and after his fainting. Of course, this question cannot be answered by measuring. The only thing that can be said is that after his swoon, mystically speaking, Moses attained a significantly more complex, purer, or true consciousness.⁸ When consciousness is altered, either by internal or induced external influences, a change in the state of consciousness occurs. The question is what exactly this means. A possible explanation of the altered state of consciousness can be found, for example, in Antti Revonsuo: “ ‘Altered State of Consciousness’ (ASC) has been defined as a changed overall pattern of conscious experience, or as the subjective feeling and explicit recognition that one’s own subjective experience has changed.” (Revonsuo 2009). This would mean that the patterns of one’s experiences have changed and that the person who experiences this change is aware of it. The American consciousness researcher and parapsychologist Charles Tart offers a different explanation for the altered state of consciousness:

An altered state of consciousness for a given individual is one in which he clearly feels a *qualitative* shift in his pattern of mental functioning, that is, he feels not just a quantitative shift (more or less alert, more or less visual imagery, sharper, duller, etc.), but also that some quality or qualities of his mental processes are *different* (Tart 1990).

There thus seems to be both a quantitative and a qualitative difference of the mental functioning in the state of ASC that can be described. The central question is whether Moses’ state after fainting can be counted in the category of ASC just discussed.⁹ According to Revonsuo, mystical experiences could also be put into the category of ASC, but he interprets them as misrepresentations:

There are many ASCs that are considered positive, desirable, and ‘higher’ states of consciousness, such as flow, cosmic consciousness, and enlightenment. Although highly positive and desirable, they typically involve misrepresentations. One defining feature of a flow state is the distorted sense of time and self. When in flow, hours feel like minutes. Or one may feel tireless and powerful despite objective evidence to the contrary (e.g., runner’s high when running a marathon). In mystical states, there are delusions of special importance and grandeur; beliefs about a special contact with God or the Universe, special knowledge gained

through such mystical subjective channels, and distortion of the sense of time and the sense of self (Revonsuo 2009, p. 200).

Moses' experience of God, under this description, would be a misrepresentation of events or a distortion of reality. This interpretation is due to a certain view of the world, classified here as materialistic and falling under the common paradigm of naturalism. Moreover, most of the changes in the states of consciousness studied by Revonsuo are induced by hallucinations, hypnosis, drugs, or other psychotropic substances and are therefore only temporary changes of state from which the person can return to his or her original state after some time: "The state is also only temporary and reversible." (Laski 1961, p. 202). If we follow Revonsuo's line of thought, then the change in consciousness which is hallucinogenic/drug-driven must be different from the religious experience-driven change of mental state.

According to Revonsuo, then, the change in consciousness must be different from what is described by the majority of researchers. Mysticism or the state of trance in Islam has been misunderstood by numerous Western researchers. Indeed, as James Leuba, among other researchers, points out, the experience of the altered state of consciousness would be represented in this way:

By concentrating on any thought or by endlessly repeating a word, the Sufi empties his mind, loses his sense of the reality of the external world, and experiences a state of "psychic homogeneity" from which all distinctions have disappeared, and in which nothing but a general consciousness of existence remains: his life and that of the universe seem to be mixed together (Leuba 1927, p. 142).¹⁰

But this is not at all what is understood by the state of trance in Islamic mysticism. Neither is a 'psychic homogeneity' established, nor is one's own life to be mixed with the universe. Although it is true that many practicing Sufis strive for this, trance is primarily about the annihilation of one's own ego in the conception of Islamic mysticism. Only through this annihilation does a new, divine consciousness arise. However, to speak of a 'psychic homogeneity' here is a mistake, because in the state of *fanā*¹¹ there is no ego left that wants to experience psychic homogeneity. Rather, a similar state to the so-called 'no-mind' in Zen Buddhism, among other things, is achieved, i.e., a state in which one no longer has any thoughts. A person in this state is then no longer 'I', but everything that is, is experienced as God. In other words, contingent being is annihilated in order to obtain true being. Whereas this state seems to be temporary—for example, for the duration of a prayer—it can also bring about a lasting change in consciousness. I will consider these two changes in the following.

4. Unconscious State and REM Sleep

It is reported that the first Imam of the Shiites, 'Alī ibn Abī Ṭālib, was shot in the foot with an arrow at the Battle of Šiffin around 657 AD. Because of the severe pain it caused, the arrow, which had gone deep into the bone, could not be removed painlessly from his foot until someone suggested that it be taken out during his prayer. The reason for this suggestion was that 'Alī ibn Abī Ṭālib was normally said to be so deeply absorbed in prayer that it was assumed that he would not feel any pain if the arrow were removed while in this state. This was indeed done according to the instruction, and 'Alī ibn Abī Ṭālib, according to tradition, did not feel any pain when the arrow was removed (al-Jazā'irī [1378] 1999, p. 371). The reason for this seems to be that he was at the highest level of self-development during prayer, and his state corresponded to the *fanā' fī llāh wa-baqā' bi-l-llāh*. The question is why the direct manifestation of God did not lead to unconsciousness in 'Alī ibn Abī Ṭālib, whereas it did in Moses. Perhaps 'Alī ibn Abī Ṭālib had a higher inner capacity at this time than Moses did at the time of the event. Rudolf Otto describes the *fanā'* state in Moses first as an experience of divine fascination *mysterium fascinosum* and then as a fainting mystery, a *mysterium tremendum* (Otto 1917). In Otto's words, it could be said that 'Alī ibn Abī Ṭālib had not experienced the *mysterium tremendum* that Moses had. He

was therefore not deterred from the experience of God because, as a perfect human being, he was the embodiment of all divine names and attributes (from the perspective of Shi'a theology). For this reason, it could be concluded that he occupied a higher position than Moses when the latter expressed the desire to see God. Even if Moses himself was a prophet, Moses' desire shows that, at least at that time, he had not yet reached the necessary level of self-emergence. However, it could be assumed that this was made possible for him by the *mysterium tremendum* during his fainting.

A fainting state in the form of an expansion of consciousness could be exactly what happens during REM sleep.¹² In fact, it can be claimed that Moses' fainting can be compared to the state of people during REM sleep.¹³ This belongs to the subject of phenomenal quality or qualia, that is, what a subject experiences in a particular mental situation and what is connected with the difficulty of describing it to another person. Conscious experience is inexpressible, subjective, bodily, qualitative, indivisible, indubitable, self-conscious, and intentional. It is therefore mentally impossible to describe the subjective contents of experience to other people without them also undergoing the same experience. The thesis that Moses' fainting can be compared to REM sleep certainly does not imply that it is possible to comprehend exactly what Moses experienced. However, that Moses reached a new level of consciousness can be considered certain. It could then be that his experience also applies to all persons who have had a religious-mystical and transcendental experience during their prayer. 'Alī ibn Abī Ṭālib could be regarded as a *pars pro toto* example (at least in the Shi'a tradition), which is not easy to achieve (not saying impossible) for shutting down all emotions, especially the emotion of pain during religious activity. It is the different levels of inner capacity which lead 'Alī ibn Abī Ṭālib and Moses to experience different levels/states of consciousness.

5. Neuropsychological State of the Brain during Prayer

In this section, the state of the brain during prayer and especially during self-renunciation is examined from a neuropsychological perspective. In other words, the question of what happens in the brain during the *fanā'* state will be discussed.¹⁴ There are different gradations for this *fanā'* state. In the following, we will take a closer look at which processes take place in the brain during these different stages in order to show parallels between panpsychism and Islamic mysticism.

In modern times, other scientists have also experimentally investigated mystical religious experiences, including Mario Beauregard, who carried out fMRI studies on nuns of the Carmelite order and came to the conclusion that a large number of regions in the brain are involved in prayer, which argues against a single, specific 'God module' in the brain, as proposed by Persinger (Messer 2017; Beauregard and Paquette 2006, 2008; Beauregard and O'Leary 2008). Some scholars refute the idea of a God module, while others—such as some Muslim scholars—still rely on this theory.¹⁵

The US neuroscientist Newberg, whose research focuses on the field of neurotheology, investigates religious experiences at the neuronal level.¹⁶ As a pioneer in the field of neurotheology, he is convinced that there is an interface between the natural sciences and religion:

Neurotheology ideally is a 'two-way street' in which science and religion can mutually inform each other. Thus, neurotheology can provide a new perspective to old questions. It does not replace current theological or doctrinal concepts but rather provides a different perspective that integrates the best of what science can offer with what religion and spirituality offer. Importantly, this integrated approach can show that science and religion need not be at odds with each other. In fact, neurotheology can be an important intersection for science and religion (Newberg 2016).

Newberg has cited particular models or mechanisms for religious experience (Messer 2017). One example of this mechanism is the Absolute Unitary Being (AUB), which will be

discussed in more detail below. In examining the extent to which religiosity or irreligiosity changes the brain during prayer or meditation in the meditator, Newberg says:

Individuals who practice prayer and meditation over many years have been found to have thicker and more active frontal lobes than nonpractitioners. [. . .] Meditation practices actually change the brain over time. In particular, structures such as the frontal lobe and thalamus were different over an eight-week period of daily meditation. The thalamus is a central structure that helps regulate many brain processes and also is the primary pathway for sensory perceptions. Some have even argued that the thalamus is the seat of consciousness. If the thalamus can be affected by only eight weeks of meditation, one can imagine what might happen to the brain when a religious individual participates in services and prayers over many years of a lifetime (Newberg 2016, p. 22).

Newberg also seems to be of the opinion that the thalamus plays a role in the development of consciousness. There is an altered structure in the thalamus, and as a result, there is a change of consciousness. This raises the question of whether religious people generally have an altered consciousness as a result, which Newberg answers affirmatively. Interestingly, he also looked explicitly at the brains of practising Sufis and discovered the following:

In addition to the frontal lobe findings on our brain scans of Dhikr, we found that parietal activity declined after fifty to sixty minutes of chanting, similar to what happened when our Christian and Buddhist meditators engaged in hour-long practices. Since this area is responsible for constructing and maintaining our self-image, a sudden decrease helps to explain why many spiritual practitioners say that their sense of self—their ego—seems to disappear, an important element often talked about in Eastern philosophy. All that remains is the object of our contemplation: the Unity with Allah, a merging with the universe or pure consciousness, or feeling closer to God. As the Islamic texts proclaim, in that moment ‘there is no God but God.’ From a neuroscientific point of view, you might say, ‘there is no awareness but awareness,’ or ‘there is no love but love,’ perspectives echoed in the meditation traditions of Buddhism, Hinduism, and Christianity. It is a neurologically ‘real’ state of *being-ness* that promotes inner and outer peace. Unity consciousness allows a person to feel intimately connected with everyone and everything, and the love that bursts forth from both one’s heart is one of the essential goals of the Sufis (Newberg and Waldmann 2016, p. 153).

It is precisely these investigations that are of particular interest here, as they also assume that the first step of a mystical union is self-surrender and the removal of external and internal stimuli (Newberg and D’Aquili 1999). Greek Orthodox mystics of the 5th century believed that God can only be known through a soul that “has been cleansed of all distracting and images.” (Newberg and D’Aquili 1999, p. 126). This state is referred to as “inner silence” (Ibid.) and as a way “to open the door to a mystical union with God.” (Ibid.) Newberg believes that mystical experiences are expressed both in language and in terms of the different respective cultures that underlie them. The content of this mystical experience is not only dependent on the cultural embedding, but is also altered by the mystic who has it: “[. . .] not only do mystical experiences differ in terms of language of the culture in which they are embedded, but their very content is altered by the cultural experience the mystic brings to them.” (Newberg and D’Aquili 1993, p. 178). But even if the individual content differs culturally, we can speak of specific processes in the brain that are the same in their characteristics (Ibid.).

Newberg calls the state of mystical union, which is a kind of devolution and the same in all different faiths and cultures, the state of Absolute Unitary Being (AUB):

AUB is a state in which the subject loses all awareness of discrete limited being and of the passage of time, and even experiences an obliteration of the self-other

dichotomy. [. . .] If AUB is experienced, accompanied by blissful positive affects, it is usually interpreted as the *unio mystica* or the experience of God (Ibid.).

For this state, Newberg uses the term Self-Transcendent Experience (STE) (Yaden et al. 2017), which means “the state of absolute unity”. In this state, the boundary between the ego and the outside world is dissolved and the feeling of space and time disappears. The research question in this paper is whether the mystical term *fanāʾ* can be equated with the designation of AUB devised by Newberg. Furthermore, it needs to be clarified whether the same processing of emotions take place in the brain during these two events.

The limbic system in the brain, which is responsible for processing emotion, plays an essential role in the emergence of mystical experiences. Not only Moses’ fainting, but also ‘Alī ibn Abī Ṭālib’s painlessness during prayer can be explained by the functioning of the limbic system, i.e., the switching off of the sensitive impulses from the central nervous system. According to Newberg, stimulation of the limbic system explains this type of experience:

[T]he principle of selective stimulation and deafferentation of various brain structures accompanied by various patterns and degrees of intensity of limbic stimulation may hold the key to explaining most, if not all, religious experiences, and possibly the secret to the nature of aesthetic experiences as well (Newberg and D’Aquili 1993, p. 196).

The limbic system is always involved, especially when it comes to “attention or concentration” (Ibid., p. 185). During meditation, prayer, or *dhikr*, it is therefore a matter of deafferentation, which is normally carried out intentionally by the meditator. This means switching off the neuronal input, especially in the area responsible for spatial orientation. Neurophysiologically, the following happens in the brain:

[W]hen the subject wills to banish all thoughts from the mind, impulses from the prefrontal cortex inhibit the transmission of information from the inferior parietal lobule to the PSPL [Posterior Superior Parietal Lobule] [. . .]. This partial deafferentation consists of the total blocking of input from the inferior parietal lobule, as well as the attempt not to pay attention to direct sensory input (Ibid., pp. 186–87).

In this respect, Newberg concludes that the AUB state in the brain comes about through deafferentation in the right and left PSPL, thereby acquiring an experience of absolute unitary being (Ibid., p. 194). Newberg concludes that the process of meditation is accompanied by increased activity in the frontal lobe, and that this increased activity corresponds to decreased activity in the parietal lobe. Accordingly, the meditators’ increased attention and their experience of a dissolution of the sense of space become visible in the images (Newberg et al. 2001). In other words, it could also be said here that the images show what happens in the brain when awareness of the boundary between ‘I’ and the outside world dissolves.

Yaden and colleagues further refined these observations and found that many subjects also experience a self-transcendent experience (STE). Unlike the AUB state, STE is characterised by different levels of intensity and gradation, showing a clear “[v]ariability in the intensity of perceived unity is apparent in several [. . .] degrees of self-transcendence.” (Yaden et al. 2017). Yaden and colleagues describe STE as transient states of diminished self-awareness and an enhanced sense of connectedness (Ibid.).

The STE is described as a state with several gradations, just like the *fanāʾ* state, as a unitary continuum (Ibid.). It seems that this unitary continuum in Newberg’s case leads to the AUB state, which means a total shutdown of active consciousness and thus of the ‘I’ state. Furthermore, it can be stated that this corresponds to the highest state of *fanāʾ*, namely the *fanāʾ fī llāh wa-baqāʾ bi-l-llāh*. Different terms are used for this state in psychology or neuroscience: “the states of mindfulness”, “flow”, “self-transcendent positive emotions such as love and awe”, “peak experiences”, and “mystical experiences” (Csikszentmihalyi 1991).

All these states have in common “decreased self-salience and/or increased feelings of connectedness” (Yaden et al. 2017, p. 144). In all cases, the degree of self-consciousness is reduced and an increased feeling of connectedness arises. It should be added that empirical research on STE according to Newberg is also conducted under other names such as “hypoegeic states”, “transpersonal experiences”, “unitary experiences”, “quantum change”, “religious experiences”, “spiritual experiences”, “sacred moments”, “epiphanic experiences”, “ecstatic experiences”, “anomalous experiences”, “non-dual awareness”, “near-death experiences”, “mystical experiences”, and “religious, spiritual, and mystical experiences” (Ibid., pp. 143–54). All these studies are based on the assumption that mystical-religious experiences can be measured on a scale:

Scales have also been developed to standardize the measure of mystical experiences. Foremost among these is the Mysticism Scale [. . .], which operationalizes James’s characterization of mystical experiences and includes items such as ‘I have had an experience in which I realized the oneness of myself with all things.’ Hood (1975) describes the ‘Ego Quality’ factor of this scale as referring to ‘the experience of a loss of sense of self’ while consciousness is nonetheless maintained. The loss of self is commonly experienced as an absorption into something greater than the mere empirical ego (Ibid., pp. 147–48).

Referring to this scale, the quality of the ego, and the experience of Moses, which was used as an example of self-development, it can be concluded that Moses experienced a state of “self-loss” (Ibid., p. 149) that led to a new consciousness. Interestingly, Newberg also sees self-loss as a change in consciousness that can have various consequences: “Self-loss should thus be considered an alteration of consciousness with potentially pathological or positive consequences.” (Ibid., p. 149)

In the example given, the state of self-loss had positive consequences for Moses, because it led to him attaining a new, changed, and more highly developed consciousness. As already mentioned, the US neuroscientist McNamara has also dealt with the change of the self. In his work *The Neuroscience of Religious Experience*, he describes the religious experience of the praying person as a “transformation of the self” (McNamara 2009, p. xi). The praying person approaches his/her “ideal self” in prayer and this level is the centralised and unified form of the self (Ibid.), whereas people normally—outside of prayer—experience a “divided self” (Ibid.). Through the practice of religion, however, a “centralised executive self” emerges, according to McNamara (Ibid., pp. 44–58). Religious practices that produce such a state are cognitive processes that he calls decentering and which have the goal of reducing the discrepancy between the current state of the self and the “ideal self”. In the process, the ego state is initially set “offline” in the now (Ibid., p. 44). This too finds a counterpart in the descriptions of how Moses experienced a new consciousness after his *fanā* state. The new consciousness follows the loss of self; they are not simultaneous. The question, then, is whether he received a centralised, executive ego after his *fanā* state. On the basis of his utterances, this question can be answered positively, because he describes what consequences these experiences have for him.

It follows that it must be possible for the individual to have an awareness of his consciousness, because otherwise he could not know that he has just experienced something or received a new consciousness (Spät 2012, p. 15). Newberg describes this as follows: “Consciousness is related to awareness in that consciousness represents an awareness of the self as object. Thus, the individual is both the subjective experiencer as well as the object that is experienced” (Newberg and D’Aquili 1999, p. 21). This discussed form of change in consciousness, which involves a different concept of consciousness, is very different from that which Moses experienced through his mystical experience. This state can rather be described as the attainment of a new consciousness or a more expanded consciousness, which is permanent and not only temporary.

6. Conclusions

Whether it is actually possible to interpret all mystical experiences neurophysiologically will remain an open question. However, Moses annihilated his actual self during a *fanā'* state according to the interpretation explained here, gained a new consciousness and subsequently became a new man followed by gaining a higher level of consciousness. The thesis put forward in this paper is that Moses did not just experience a temporarily altered state of consciousness, which could be induced by drugs, but a higher level of consciousness which would last, for him, a lifetime. In other words, he did not have just an altered state of consciousness, and his gaining a new level of consciousness is not at all what is understood by the state of trance, nor is it regarded as a kind of 'psychic homogeneity', in which one's life is mixed with the universe. Rather, he experienced an AUB state and the most intensified gradation of STE. In addition, with reference to IIT, Moses possessed the highest degree of phi (ϕ) or consciousness both before and after his fainting. Comparing it with the phases of REM sleep, he must not be really unconscious in a literal sense, but rather, as it was shown that the brain is remarkably more active in the state of REM sleep than in the waking state; according to McNamara, Moses could also be regarded more awake than being awake during his experience of fainting and experiencing an inner earthquake.

While a change in Moses' state of consciousness did take place, it would be more accurate to speak of the annihilation of the old 'I' consciousness and the creation of a new consciousness instead of an altered state of consciousness. While stating that he had not reached the necessary level of self-emergence, like 'Alī ibn Abī Tālib, it could be assumed that this was made possible for him during his fainting.

In other words, the state of Moses should be regarded as a "heightening". However, according to the mystical teachings and the Islamic tradition discussed here, full consciousness could also be attained during his lifetime with the injunction "Die before you die!" (al-Majlisi 1983, vol. 69, p. 59).¹⁷ Here the process of self-development is addressed, which is to lead to a full awareness of the truth, i.e., of God. In order to reach this stage, the actual ego (or the "I") of the respective human being must be destroyed or extinguished so that a new, divine consciousness can then be attained.

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Notes

- ¹ The exact source of this quote is unknown.
- ² A representative of such an approach is the German brain researcher Wolf Singer, who both denies the existence of a human soul and considers humans to be determined in their actions or to have no freedom of will and action at all. See for example (Singer and Ricard 2011; Singer 2013).
- ³ Appropriately, for example, there is a tradition of the Prophet that says: *al-nāsu niyāmun fa-idhā māṭū intabahū* (Translation: "People sleep, and only when they die do they wake up.") Source: (al-Majlisi 1983, vol. 50, p. 13).
- ⁴ However, one could posit that the hard problem does not exist at all, because in a monistic or parallel worldview, or also in the Islamic philosophy of the 17th century (i.e., Mullā Ṣadrā), the dichotomy does not exist. The respected reader is invited to have a closer look at *Mulla Sadra and the Problem of Other Minds* by Reza Akbari. A further investigation about Mullā Ṣadrā would go beyond the topic of this research and the scope of this discussion.
- ⁵ According to the Old Testament (Exodus), God appeared to the prophet Moses in the form of a burning bush and commanded him to save the people of Israel from Egyptian slavery. However, since the Bible only refers to talking to God and not to his unconsciousness, the biblical passage is not discussed in this paper.
- ⁶ The biblical Quranic figure Moses had the ability to talk to God and is considered a prophet of God. He had the desire to see God and subsequently became unconscious. He fell unconscious because of the direct manifestation of God's majesty, and since he

did not have the inner capacity and the receptivity to take up the sudden, direct manifestation of God, he fell unconscious. He is a common figure in the monotheistic religions, and in this respect his example can serve interreligious dialogue. For a detailed consideration of the mystical investigation of Moses' unconsciousness, see for example: (Jahangiri Forthcoming), especially p. 185ff.

The effect that the story presents, with Moses gaining a new level of consciousness, is just an example of a general phenomenon, namely a feeling of annihilation in the divine through the mystical union. This and similar examples will be used in this article to expand on what scientists have said about religious experiences.

7 The IIT theory as such is a mathematical form for underlining panpsychism. In other words, it is a scientific support for panpsychism, as it holds the view that everything that exists has some form of mental properties. There is nothing that does not have mental properties or preliminary stages of mental properties.

8 There is no single place in the Qur'ān which mentions that Moses attained a more complex, purer or truer consciousness. This innovative approach of combining mysticism and Islamic thought with neuroscientific consciousness studies is done by the author.

However, the idea of Moses gaining a new self (leaving out the idea of consciousness) is studied in the secondary literature, especially in the Persian language, and in the mystical qur'ānic interpretations and commentaries of the encounters of Moses with God. The verse 7:143 plays a large role in Islamic mysticism and is also called the *tajallī* (manifestation) verse in Persian mystical literature. For example, a Persian Sufi commentary on the Qur'ān is written by Abū l-Faḍl Rashīd al-Dīn al-Maybūdī: *Kashf al-asrār wa-'uddat al-abrār* (Unveiling of mysteries and supplying of the righteous). It is needless to mention that, of course, we do not say that for everyone who faints, that he will gain a new consciousness.

9 An interesting introduction to the character of so-called anomalous experiences and their scientific descriptions can be found in: (Cardena et al. 2000). Regarding, in particular, the experience of a mystical state, see in the same volume Wulff, David M.: Mystical experience, pp. 397–400. (Kass et al. 1991) Concerning religious experience, see, inter alia, (Kass et al. 1991). Health Outcomes and a New Index of Spiritual Experience. In *Journal for the Scientific Study of Religion* 30/2, pp. 203–211; (Maslow 1964; Newberg and D'Aquili 2000).

10 Original in German, translated by this author.

11 *Fanā'* is an arabic term in Islamic mysticism meaning the annihilation or the denial of the self in order to achieve union with God. After the loss of the self, the mystic will achieve the state of *baqā'* (subsistence) in God.

12 According to McNamara, human consciousness can best be studied in the phase of REM sleep. Interestingly, although the body is calm during this phase, the brain is remarkably more active in the state of REM sleep than in the waking state. Contrary to the opinion that humans are in an unconscious phase, this very circumstance could point to a heightened state of consciousness in this sleep phase, per McNamara. In the state of REM sleep, humans dream, and dreams are considered relevant to consciousness. An example that shows the parallels between the state of REM sleep and unconsciousness at this point is the example of Moses. Adapted from McNamara's theory, Moses' fainting could have been unconsciousness only when viewed from the outside. The events and lore could also be interpreted to mean that an 'inner earthquake' occurred in his inner self during this time, leading him to a higher level of consciousness. According to McNamara, REM sleep is basically a mechanism of social bonding of the child with the mother, characterised by "a complete absence of muscle tone in the anti-gravity muscles and by brain-wave activity like that in the waking state in many regions of the brain (especially limbic regions)." McNamara even states that complete personality change can occur during REM sleep. In some cases, greater aggression is measured during REM sleep than in other sleep phases. He refers to this phenomenon as the transformation of Mr. Hyde into Dr. Jekyll. The events in this sleep phase show parallels to the tradition according to which Moses could have reached a new state of consciousness in the waking state after fainting, i.e., physical unconsciousness. Accordingly, a physical state of unconsciousness does not have to be equivalent with actual unconsciousness, but may perhaps even represent a heightened consciousness (Patrick McNamara 2009).

13 It should be mentioned here that while we could say that Moses fainting is like a REM sleep state, we cannot expand it to all mystical experiences. This does not imply that mystical experiences are a kind of dreaming, because they are real. The point is that the brain's state during such REM sleep states is more active than in an awake state, and therefore, perhaps the brain of someone who is in a mystical state is more active than in a non-mystical state.

14 This does not mean that every prayer automatically leads to a *fanā'* state.

15 In Scientific Commentary of Suratul Faateḥah, Ebrahim Kazim said that even atheists who do not believe in God at least have the neural capacity to do so. To use an analogy, this is because this God module in the temporal lobe functions like an antenna that connects humans with the divine. He mentions the term *taqwā* (obedience) or 'God-consciousness' as an equivalent designation of the God module. Cf. (Kazim 2011, pp. 317–18).

16 Newberg mainly examines the relationship between neuroscience and mystical experiences. Among others, he has written the following books in the field of neurotheology (including in collaboration): *The Mystical Mind. Probing the Biology of Religious Experience* (Newberg and D'Aquili 1999), *Why God Won't Go Away: Brain, Science and the Biology of Belief* (Newberg and D'Aquili 2001), *Why we Believe What We Believe* (Newberg and Waldmann 2006) and *How God Changes Your Brain* (Newberg and Waldmann 2009).

17 *Mūtū qabla an tamūtū* ("Die, before you die!").

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