

## **Neuroscientific Explanations of Religious Experience are Not free from Cultural Aspects**

Anne L. C. RUNEHOV\*

*\*Department of Systematic Theology,  
Copenhagen University, Denmark*

### **Abstract**

We cannot disregard that the neuroscientific research on religious phenomena such as religious experiences and rituals for example, has increased significantly the last years. Neuroscientists claim that neuroscience contributes considerably in the process of understanding religious experiences, because neuroscience is able to measure brain activity during religious experiences by way of brain-imaging technologies. No doubt, those results of neuroscientific research on religious experiences are an important supplement to the understanding of some types of religious experiences. However, some conclusions drawn from neuroscientific research on religious experiences are arguable. For example, one such conclusion is that religious experiences are actually nothing but neural activity, i.e. there is nothing 'religious' to the experiences at all. Another such conclusion is that a person's religious experiences actually derive from some ultimate reality, meaning that religious experiences are real. It is the latter assertion that will be analyzed in the present paper. The question is asked whether neuroscience alone is able to affirm that religious experiences are real or whether there are, besides neuroscientific issues, also cultural-religious assumptions that underlie this conclusion.

### **Introduction**

The study I choose as a passage to the analysis is an empirical neuroscientific study titled "The Measurement of Cerebral Blood Flow during the Complex Cognitive Task of Meditation using HMPAO-Spect Imaging", by Andrew Newberg, Abass Alavi, Michael Baime, Michael Pourdehnad,

Jill Santanna and Eugene d'Aquili.<sup>1</sup> For the sake of what I aim to discuss below, I had to simplify Newberg et al.'s study and ignore its original aim, which is to understand the correlations between the brain and religious experiences obtained by way of meditation. My purpose instead is to show that neuroscientific explanations of religious experiences cannot stand aloof from the cultural understanding of religious experiences. I will start with a presentation of the study, where after I will discuss the results and some conclusions that Newberg et al. arrived at. Thereafter I will account for cultural presuppositions that underlie some of Newberg et al.'s explanations of religious experiences and argue that their neuroscientific explanations are not free from cultural assumptions. Let us now consider the study.

### **The Study**

The participants in the neuroscientific study performed by Newberg et al. on religious experiences obtained by meditation were male and female Tibetan Buddhist meditators and Franciscan nuns between the ages of 38 and 52. All persons had more than 15 years of practice of meditation or prayer. They practiced at least one hour per day and at least five days a week. Furthermore, all of them had participated in several retreats lasting a minimum of three-months and in one yearly retreat of one month. The control group existed of nine healthy persons who did not perform any meditation. They were brain-scanned once during 20 minutes. However, even if both the participants who meditated and those who did not were SPECT-scanned at baseline, only the meditating persons were also SPECT-scanned in a later phase of the experiment.

The task of the participants began with the instruction to put themselves in their preferred position for meditation or prayer. They were allowed to surround themselves with objects that they generally use when they

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<sup>1</sup> Newberg, A. et al. (2001b).

meditate or pray and/or which facilitates meditation, for example, candles and sticks of jasmine incense. Before starting their meditation, they were injected with a specific radioactive tracer and brain-scanned 20 minutes later in a Single Photon Emission Computed Tomography (SPECT). To whom it may concern, the radioactive tracer contained 7 mCi (milli-Curie) HexaMethyl Propylene Amine Oxime (HMPAO). Newberg et al. registered the values for the regions of interest of the brain. To be able to measure neural activity during meditation the participants were connected to the research team by way of a common cotton twine, which they had to pull as soon as they felt that they approached their most intensive moment of meditation, (called Absolute Unitary Being by Newberg et al.) Twenty minutes later, they were SPECT-scanned during 30 minutes and Newberg et al could register the new values.

Generally considered, Newberg and d'Aquili observed that the meditators, during the act of meditation, had increased rCBF (reginal Cerebral Blood Flow) in the inferior and orbital frontal cortices, the dorsolateral prefrontal cortices (i.e. the cortices situated right back of the side of the brain), the sensorimotor cortices, the dorsomedial cortices (i.e. the cortices at the backside of the middle of the brain), the midbrain, the cingulate gyri and the thalami. The other parts of their brains did not show any significant changes in neural activity.

More specifically, when the values of the baseline scans were compared with the values of the scans taken during meditation, they discovered that there was a significant increase of activity in the frontal lobes, known as the seat of cognition and emotion. However Newberg et al. did not find a significant decrease in the posterior superior parietal lobes (PSPL) as they previously had suggested.<sup>2</sup> The SPECT images of the brain of the participants taken before they began to meditate showed that there was furious neurological activity in this brain

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<sup>2</sup> d'Aquili, E./Newberg, A. (1993)/(1999).

area. This activity appeared on the computer screen of the SPECT as vibrant bursts of brilliant reds and yellows. The images taken during the act of meditation however, showed the same area in green and blue, i.e. darker colours indicating a reduction in activity. The darker the colours the stronger the decrease of activity. When the colour turns black, there is no activity at all, i.e. the brain died.

Newberg et al. had hypothesized that there would be a decrease in activity of the sensorimotor areas during meditation, because meditation is said to bring about a decrease in sensory awareness and motor activity. However, this was not confirmed, rather, the opposite occurred and an increase was measured. Newberg and d'Aquili guessed that, to maintain the posture of the meditator, (for example the lotus position); there might be a significant degree of activity required in the sensorimotor areas. Furthermore, there may be some form of visual input from the internal images generated during this type of meditation.

However, in a previous study, Newberg and d'Aquili designed neurological models of different meditation techniques. One of them, called the Via Positiva implies that the meditator focuses on a preferred inner or outer image to put her in a meditative state. Hence, that could explain the unexpected increase of activity in the sensorimotor areas.<sup>3</sup> As for the present study perhaps secondary remark but which I found important to make in Sacred or Neural is that if they had not only paid attention to the neural activity that is specifically active during the meditation process but had also paid attention to the type of meditation technique that was performed at the moment of the scanning, we probably would have known whether the results are related to Tibetan meditation or Franciscan praying or to both.<sup>4</sup> The brain-images also showed increased activity in the midbrain because of autonomic

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<sup>3</sup> d'Aquili, E./Newberg, A. (1993)/(1999).

<sup>4</sup> Runehov, A.L.C. (2007) chap.6.

changes during meditation. However, there were no significant neural changes in the cerebellum, superior frontal, or occipital areas, since the function of these brain structures are normally not associated with meditation. However, and unexpectedly, they found significantly increased activity in the thalamus, something that may be important for the overall complex processes associated with meditation, including both cognitive and affective responses. Finally, Newberg et al. discovered that the meditators had a significantly different thalamic laterality index at baseline than had the non-meditators.

### **Discussion**

The results show whether the hypotheses were confirmed or not and they show which brain structures and functions that underwent increased or decreased neural activity at the most intensive moment of meditation and prayer. However, they do not tell us anything about the phenomenon religious experience itself, about the quality of the experiences, about the core characteristics of the religions to which the meditators belonged, nor about the reality status of the experiences. Furthermore, they do not tell us anything about the experiencers themselves or about how they interpret their religious experiencers. Nevertheless, Newberg et al. emphasize neuroscience's weight when they present their neuroscientific view on the reality of religious experiences, as follows.

Firstly, Newberg et al. equal all human experiences, neuroscientifically seen, and they mean that everything we experience we experience in a second-hand-way, i.e. all our experiences are mediated by our brain. They write:

If God exists, for example, and if He appeared to you in some incarnation, you would have no way of experiencing His presence, except as part of a neurologically generated rendition of reality. You would need auditory processing to hear His voice, visual processing to see His face, and cognitive processing to make sense of His message. Even if He spoke to you mystically, without words, you would need cognitive functions to comprehend His meaning, and input from the brain's emotional centers to fill you with

rapture and awe. Neurology makes it clear: There's no other way for God to get into your head except through the brain's neural pathways. Even if there were a soul through which God could communicate, it would have little cognitive meaning to us without a brain.<sup>5</sup>

Thus, if God exists and wants to communicate with us, God cannot do this otherwise than by using different brain structures and functions. Newberg et al. suggest that, neurologically seen, experiencing Absolute Unitary Being or God is identical to experiencing eating a piece of apple pie, because brain-scans of a person eating a piece of apple pie show the neural activity involved in eating apple pie. For example, the olfactory areas that registering the aroma, the visual areas picturing the piece of apple pie, the centres of touch holding the piece and the areas responsible for taste show, similar to the brain-scans, the neural activity involved in experiencing Absolute Unitary Being. Secondly, Newberg et al, write, "there can be little doubt that Absolute Unitary Being exists, even if it is a relatively rare state".<sup>6</sup>

In another study, Newberg and d'Aquili also maintain that so real do these experiences appear when recalled in baseline reality that they have the ability to alter the way the experiencers live their lives [...] "[T]he word real is not here used poetically or metaphorically. It is used in the same sense as in the utterance "This rock and this table are real".<sup>7</sup> Newberg et al. support their view by referring to plenty of evidence for its existence in cross cultural religious literature and the testimonies of living mystics and other people who experienced Ultimate Reality, (among them the subjects of their neuroscientific studies) regardless of which religion they belong to. These people, they say, remember the Ultimate Reality experience with the same degree of clarity and sense of reality as they remember everyday events of the past, something that is not the case with, hallucinations among others. In fact, where Ultimate Reality experiences are remembered as superior to baseline reality, dreams

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<sup>5</sup> Newberg, A. et al. (2001a) 37/183: note 1.

<sup>6</sup> d'Aquili, E./Newberg, A. (1996) 248.

<sup>7</sup> d'Aquili, E./Newberg, A. (1999), 192.

and hallucinations are remembered as inferior to baseline reality.<sup>8</sup> It hence seems that they want to give Absolute Unitary Being or God an identical reality status, for example, a piece of apple pie when they maintain that Absolute Unitary Being doubtlessly exists.

The problem with the first assertion, however, is that it is not clear at all how we should understand Newberg et al.'s claim that all experiences are identical on a neurological level. Firstly, assume that Peter and Nancey eat a piece of the same apple pie. They will probably not describe their experience identically. Peter might say that the apple pie was not sweet enough while Nancey might say that it was too sweet. Peter might have been hungry when eating the pie while Nancey might have eaten it because it was served at coffee time in the office. The latter clearly implies that different brain structures and functions had to be activated for example, the brain structure that has to do with being hungry, which will not be activated in Nancey's brain. Hence, Peter and Nancey's experience of eating a piece of apple pie cannot be equal neurologically seen. Similarly, Mark and Rita, who have been practicing the same meditation technique for twenty years and have been practicing at least two hours per day etc., probably had and still have different religious experiences.

However, Newberg et al. could counter argue that what they mean is that the experiences are identical neurologically seen in the sense that, whatever the person experiences it has to be mediated through brain structures and functions, and that this is so for all types of experience, religious and others. We can agree upon that, however, there is yet another problem namely, some

neuroscientists claim that every brain is unique, that brains are like faces. Since there are no identical faces, not even identical twins have identical faces; there cannot be identical brains either, at least by nature. Advanced plastic surgery might, be it today or in the future, be able to create

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<sup>8</sup> d'Aquili, E./Newberg, A. (1999), 192.

two identical faces. Furthermore, we do not know what cloning techniques might bring about in the future. Furthermore, besides these nature aspects, (i.e. genes, nutrition, disease, laws of physics and chemistry) we also have to consider the nurture aspect (i.e. our interaction with our environment –culture – from the day we are born until the end of our days), as well as the personal aspects (i.e. our action and choices). Every brain thus changes constantly and uniquely. Neuroscientists call this continuous modification of the brain for the brain's plasticity.

People do things differently at different times and do different things, which must imply that our brains develop differently and thus are different. For example, even if the identical twins, Maddy and Maggy, who were my classmates in ground school, dressed alike and practically did the same things all the time, they did not do everything in the same order or with the same motivation or intensity. For example, Maddy loved geography while Maggy did not but was much better at drawing and painting than Maddy. I do not know whether Maddy became a geographer and Maggy an artist but it is clear that their brains developed differently due to their interests. As identical twins, their brains might have looked very similar at the beginning of their lives but today, their brains are unquestionably very different. Connected with this is my last remark that every experience is associated with a complexity of neural activity in different brain structures. Carol Rausch Albright writes that the "many forms of religious experience may involve almost every part of the brain".<sup>9</sup> Thus, the experience Absolute Unitary Being has to involve more neural structures than the posterior superior parietal lobes. This implies that, if two experiences are to be identical, all the neural activity involved has to be identical. Hence, I believe we may conclude that meditation and the accompanying religious experiences have to affect Mark's and Rita's brains differently and that their experiences

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<sup>9</sup> Albright, C.R. (2002), 167.



cannot be identical, not even neurologically seen. Furthermore, we may conclude that such is the case for all human experience.

Let us now take a closer look at Newberg et al.'s second claim that Absolute Unitary Being exists.<sup>10</sup> The problem is that, from a neuroscientific perspective, it is not possible to maintain that Absolute Unitary Being, which they also refer to as God, exists or is absolute reality. Let us also for the time being disregard the philosophical problems surrounding the concepts "exist, real and reality" which I am afraid do not room within the frame of the present paper. Neuroscientists cannot detect any object of experiences by way of brain scans at all for the reason that the red, blue or green spots on the computer screen of the SPECT do not refer to an object of experience, for example God or a piece of apple pie. What these spots refer to is neural activity, in other words, what the neuroscientists see on the screen is chemistry and not God or a pie. Newberg et al. hence cannot establish that Absolute Unitary Being or God exists or is real from a neuroscientific point of view only. Thus, they clearly must rely on other arguments than neuroscientific ones to support their view that Absolute Unitary Being exists or is absolute reality.

### **Cultural Implications**

Let us return to Newberg et al.'s first inference based on their studies and ask what arguments that could underlie their claim that all experiences are identical seen from a neuroscientific point of view. To discover these we have to dig deeper into Newberg et al.'s reasoning concerning the equality of experiences, especially religious experiences. They maintain that there cannot be two different experiences of Absolute Unitary Being as such. However, this claim does not derive from the results of the

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<sup>10</sup> Newberg, A. et al. (2001).

empirical neuroscientific study above, but is related to their study in which they design neurological models and hypothesize how the correlation between brain structures and functions and religious experiences obtained by way of different meditation techniques might look like. It is in this study that they maintain that Absolute Unitary Being correlates with a total deafferentation of the left and right PSPL. However, the results of Newberg et al.'s empirical study do not show a total deafferentation in the PSPL, only a tendency towards deafferentation.

However, there is also a problem from a neuroscientific point of view, because some neuroscientists maintain that a total deafferentation of the left and right PSPL is simply not possible. For instance, the neuroscientist Mogens Dalby maintains that the condition of persons who suffer from two-sided infraction in the PSPL (which is a partly deafferentation of the left and right PSPL), is such that they lack bodily perception, they cannot follow a line of argument, they do not recognize the objects which are placed in their hands or they cannot walk, etc. Hence, they do not seem to have the same control over what happens, as the meditators seem to have. Dalby argues that one cannot compare the neurological condition of these persons with the neurological condition of meditators experiencing ultimate reality. The neurological condition of the persons suffering from damage to the PSPL is regarded as a proper deafferentation of that brain area, (the condition is invariable), while the neurological condition of the meditators is considered to be a modulation of the functions of that brain area. Proper deafferentation means that all neural input or flow into a certain brain structure is cut off. The decrease in neural activity (the blood flow decrease) that Newberg and d'Aquili see in the PSPL area does not have to imply that the PSPL is completely cut off from its normal input.<sup>11</sup> There is an important difference between the "shutting down or cutting off of the [PSPL] area. [...] Shutting down neural activity

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<sup>11</sup> From my correspondence with Dr. Dalby.

is known as inhibition, and inhibition of a brain area may result in decreased blood flow to that area.”<sup>12</sup> Thus, Newberg and d’Aquili should have been more precise in what they meant by total deafferentation of the left and right PSPL, because their models seem to “require that the [PSPL] area remains active while it is cut off from its normal neural input”,<sup>13</sup> but they probably mean *while it is shut down from* its normal neural input. Newberg and d’Aquili could have added that during the experience of Absolute Unitary Being, the left and right PSPL are deafferented but not *deafferented*, i.e., even if there may not be information to generate a sense of orientation, information on how to interpret this lack of orientation will still be sent to adequate parts of the brain. While deafferentation refers to the inhibition or blockage of input into a brain structure, deafferentation refers to the inhibition or blockage of output from a brain structure.

Nevertheless, since we are analyzing how Newberg et al., reason, let me account for how I think they may have proceeded. Thus, from a previous non-empirical study, Newberg et al. borrow the idea that total deafferentation of both left and right posterior superior parietal lobes (PSPL) are correlated with the experience Absolute Unitary Being (AUB). They then maintain that there cannot be two different total deafferentated PSPL because, brain-imagine of various such deafferentated brain-structures show exactly the same neural activity (here non-activity) in the PSPL. Furthermore, since, according to them total deafferentation of both the PSPL corresponds with that religious experience AUB, they conclude that there cannot be two different experiences of Absolute Unitary Being. Newberg et al. write, “While in the state of Absolute Unitary Being, [t]here is only absolute unity, and there cannot be two versions of any unity that is absolute”.<sup>14</sup> Let me reconstruct their argument.

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<sup>12</sup> Spezio, M.L. (2001), 482.

<sup>13</sup> Spezio (2001) 482.

<sup>14</sup> Newberg, A. et al. (2001), 123.

1. If there is AUB then there is a total deafferentation of both PSPL

2. There are no two different total deafferentations of PSPL possible

**3. Conclusion: there cannot be two different AUB**

A problem is that not all mystics would agree that 3 follows from 1 and 2, i.e. that there are no different Absolute Unitary Being experiences possible even if they might recognize certain experiences that are associated with Absolute Unitary Being, for example, the experience of union, of timelessness, etc. Some Christian mystics for example would not describe their experience of ultimate reality as an experience of nothingness but of love. Some may say that they felt united with God, others may say that they felt as being a drop of water in the ocean, again others will interpret their experience as an experience of total emptiness or nirvana, etc. Let me propose the following stories by way of illustration. I want you to imagine Sister Helen, a Christian nun, in kneeled position before the altar of a little chapel. Assume that she has been praying in the same position for hours, her eyes fixed on the candle light on the altar. Assume further that she experiences feeling one with the light of the candle she was focusing on, and after a while experiences Absolute Unitary Being. Thus, afterwards, she will remember this experience as having been one with the light. Furthermore, belonging to a Christian theistic religion, Sister Helen will probably say something like “the Light is one nature consisting of the oneness of life which is the Father, the Light itself which is the Son and the glare of the Light which is the Holy Spirit.”<sup>15</sup> Imagine now Rajeev who belongs to the Hindu tradition and who experienced Absolute Unitary Being. Belonging to the Hindu tradition, Rajeev will remember his experience as a feeling of being a passenger of his body. He will probably say that he did not feel any anxiety, nor doubts, fears, ambitions, goals, desires, pains, etc. He might even say that

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<sup>15</sup> Nijs, P./Meyers, K. (ed.) (2001), 23, my translation from Dutch.

he does not long for anything else anymore than for Brahman. To return to Mark and Rita, they also will put their experience in their respective frame of cultural, religious and personal reference, when describing their experience to other people. Moreover, descriptions are related to language and language is related to culture. Hence, instead of only one description of what it is to experience Absolute Unitary Being, there probably are many versions.

However, Newberg et al. could counter argue that the experience of Absolute Unitary Being at the very moment of the experience and before the experiencer puts the experience in words (i.e. as she or he remembers the experience afterwards) is identical for all. Maybe they are right, however, the problem is that this is something that neuroscience may not be able to demonstrate. Some would raise the question whether it is possible to have non-interpreted experiences at all. Another aspect is that the way of meditating, for example, *via negativa*, *via positiva*, transcendental meditation, praying, is culture related. Hence, the cultural-religious background of the experiencer may be more significant for the experience itself than was hitherto believed. The cultural-religious background may not only be significant for the interpretation of the religious experience by the experiencer but also even for the religious experience itself.

Let us return to Mark and Rita and assume that Mark practices *via negativa* and Rita *via positiva*. Assume that Mark practices *via negativa* because he has studied this technique in Taiwan during his youth because his parents worked at the Swedish embassy in Taiwan at that time. Assume that he continued practicing meditation by way of the *via negativa* technique ever since. Assume further that Rita participated in several long-time retreats in Christian convents. Assume that both Mark and Rita experience Absolute Unitary Being during their meditation sessions.

Mark's experience then will probably be an experience of wholeness, of unity, of absolute oneness, where there is no time, no space, no distinctions, and no self. This is so because, roughly, *via negativa* is a meditation technique in which the meditator concentrates on emptying his or her mind completely. Rita's experience will probably also be an experience of union but of union with the inner or outer image of her meditation, because, roughly, *via positiva* is a meditation technique in which the meditator focuses on a chosen image, (may it be an inner image or an image situated somewhere in the room or place where the meditation takes place). Thus, not only will Mark and Rita refer to their experiences in a different way -not only will they interpret their experience differently -they will actually experience them differently due to the different meditation techniques they used. Furthermore, as already pointed out, their brains, i.e. their neurology will develop in a different manner as well and will hence be different. I believe that it becomes difficult to agree with Newberg et al. that all experiences are identical, even if Newberg et al.'s intention concerns equality of experiences on a neurological level.

### **Conclusion**

Even though Newberg et al. agree that one has to take into account both the material and the spiritual side of the world when studying religious experiences, they would profit from further considering the strong impact of the culture-religious implications of religious experiences. If neuroscientists want to study the spiritual side of the world, they also need to study its cultural side more seriously. Nevertheless, this does not exclude that the experience Absolute Unitary Being, everything else being the same, is as Newberg et al. describe it. Neither does it exclude that when somebody says that she experienced Jesus, that she really did so. However, these queries belong to another debate.

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