How God Changes Your Brain: An Introduction to Jewish Neurotheology

Andrew Newberg

When we think about the relationship between the brain and Judaism there are many possibilities to explore, ranging from the practical to the esoteric. Over the past twenty years there has been a growing development in this field, which some have referred to as neurotheology. Broadly speaking, neurotheology is a multidisciplinary field of study that seeks to understand the relationship specifically between the brain and theology, and more broadly between the mind and religion. Neurotheology is not a scientific attempt to explain away religion and is also not an attempt to relegate science to an extension of 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.

The goals of this paper are to show how science and religion may be compatible, to demonstrate some evidence regarding the impact of religion on the brain, and to show how neurotheology can provide new perspectives on Jewish thought and liturgy.

In my recent book, *Principles of Neurotheology* (Ashgate, 2010), I began by emphasizing the importance of adequate definitions for a variety of terms related to religion. For example, even the terms, religion

ANDREW NEWBERG, M.D. is director of research at Jefferson-Myrna Brind Center of Integrative Medicine in Philadelphia and author of *Principles of Neurotheology* and *How God Changes Your Brain*.

and spirituality, are difficult to define. I actually use an exercise in many of my classroom settings in which I write "spirituality" on one side and "religiousness" on the other. The goal is to find words and definitions that help to define the two concepts. By not directing the discussion in any particular manner, many different definitions or concepts arise. It is fascinating to the participants to realize the difficulty in defining these two terms and the overlap that they share. In the context of Judaism, differentiating the religious from the spiritual part is important for theological and liturgical development. A person might have a strong spiritual sense of a given holiday or concept, but not necessarily a deep religious feeling, and vice versa. Furthermore, many people consider themselves "cultural Jews," which must also be considered in the context of these definitions.

The word "God," in the context of Judaism (and neurotheology), is also of fundamental importance to define. As a term, few words have caused as much anger, love, controversy, peace, and violence. Often, however, people argue about God without knowing what the other person is actually meaning. Thus, often an atheist may attribute the God of many religious individuals to be an angry and vengeful God who acts like a human being and lives in the clouds or in heaven. But most religious individuals do not view God in an anthropomorphic or angry way, but in a more abstract or spiritual way. The result might be an argument between two people with vastly different conceptions of the meaning of the term, God.

Given the multidisciplinary nature of the neurotheology, it is important to realize that definitions of many terms, including "God," may come from a variety of sources. Of course, the most appropriate initial source is theological—from sacred texts such as the Torah. However, definitions of God may arise from anthropological analysis, sociological approaches, artistic expressions, and cultural biases. Finally, definitions might be explored scientifically. For example, we performed an online survey of almost two thousand spiritual experiences. It was interesting how people described a divine interaction as related to either a force, an energy, a power, a being, everything, or nothing. We can explore how these different terms might be related to other descriptors such as emotions (i.e., feelings of awe or love). We can also ask whether these descriptions represent different interpretations of the same experience or actual different experiences.

We might also ask what areas of the brain appear associated with what types of experiences of the divine. In my prior works,

I have outlined several basic brain functions that might relate to religious and spiritual concepts. These brain functions, broadly speaking, include holistic, reductionistic, causal, abstractive, binary, willfulness, emotional value, and existential functions. Each of these functions can be generally attributed to different brain areas. For example, the holistic process may be related to the parietal lobes, which typically take our sensory information and help us to construct a sense of our self and how that self relates spatially to the rest of the world. The frontal lobes are particularly important in our sense of willfulness and have even been attributed as the seat of the will. And the limbic system is typically regarded as the emotional value areas of the brain.

Let us consider how each of these functions, or processes, can be applied to various religious concepts by using God as the example. If we use a holistic function to comprehend God, we might think about the basic Jewish monotheistic concept of God's wholeness and oneness. The holistic function might be applied both conceptually as well as experientially. Conceptually, we might understand the oneness of God as expressed in the *Sh'ma*. Experientially, an individual, perhaps a person following kabbalistic approaches, might experience a sense of oneness *with* God.

If one were to apply the reductionist function to the notion of God, one might have a sense of how God is *in* all things or affects all things. Of course, if a person was an atheist, he or she might try to reduce God to biological changes in the brain or evolutionary forces that led to the human development of religion and religious beliefs.

From a causal perspective, God might be perceived as the root cause of the universe, and hence, the cause of all things. Interesting theological debate might focus on whether God continues to cause all things to happen or whether God initiated the universe through creation, but then simply watches the universe unwind—not causing any future events to occur.

Abstract thought processes, such as reason and language, are also essential for religious ideas. In fact, the Midrash is basically utilizing all forms of abstract thought, language, symbolism, etc., to help better understand the religious ideas that exist within the Torah. As modern cognitive neuroscience explores the brain's processes, it would be fascinating to consider the many different directions Jewish theology can go based on these abstract processes. The notion of God expressed as an idea or conceived of from logical argument

(e.g., Thomas Aquinas) utilizes these rational and abstract processes. Further, trying to understand the moral concepts arising from God's covenant described in the Torah are all reflections of different abstract processes. This also pertains to how language is used in the Torah to create meaning and provide a guide for living.

The binary process is of fundamental importance in the Torah and religion. The brain has a propensity for setting up opposites as a way of understanding the world around us. The binary process helps us to distinguish good from bad or right from wrong. In religion, one of the most fundamental opposites is the difference between human beings and God. How can human beings who are finite, mortal, and limited have any ability to form a relationship with an infinite, omniscient, and all-powerful being? Of course, the nature of that relationship lies at the heart of all religions. In particular, we rely on the holistic function of the brain to bridge the enormous gap between God and human beings. Through the Torah, or the sacred texts of other religions, a guide or formula is provided for such a relationship. The binary process is bridged so that human beings can find a relationship with God.

Willfulness is another important brain process related to religion, and particularly Judaism. There is a strong sense of the willfulness of God and also the willfulness of a person. The notion of free will is an important element of Jewish tradition, and this is based heavily on our brain's ability to perceive that sense of willfulness.

The emotional values are another essential brain process when it comes to religion. Clearly we are supposed to love God, but we are also supposed to practice forgiveness, compassion, empathy, and charity, all related to our emotional processing areas. On a more practical level, we see the influence of both positive and negative emotions related to religions. Religions can foster great love and cohesion among congregants. But religions can also espouse fear and anger at those who do not adhere to the same religious beliefs. The current conflicts in the Middle East revolve strongly around the emotions of disparate groups of people following divergent religions.

The final cognitive process to be mentioned is the existential process which helps us to identify things which do and do not exist. At this point, cognitive neuroscience has not identified the areas of the brain that help us to perceive what is real and what is not. Clearly, the human brain can do this, but the brain can also be fooled such as when we are entertained by a magician.

The existential process is critical in the larger dialogue regarding God since many people believe in God's existence and many do not. How is it that one brain can be absolutely convinced God exists while another brain, looking at the same world, can be absolutely convinced God does not exist? We might consider future studies of the brain to determine whether we might find specific differences between the religious and nonreligious individuals.

Current research has not explored the question of existence so much as it has attempted to differentiate how religion and religious beliefs affect the brain, both in the short and long term. The long term studies of spiritual practices such as meditation and prayer have increasingly shown that the brain does change over time. Individuals who practice prayer and meditation over many years have been found to have thicker and more active frontal lobes than nonpractitioners.

My research group performed one of the first longitudinal studies to show that 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.

And since the brain functions are changing, the person's beliefs and behaviors are also changing. The brain changes reported to be associated with religious and spiritual practices hint at how they also reduce anxiety and depression while enhancing compassion and love. Most individuals also relate religious beliefs and practices to better coping during stressful life events, and improved relationships.

In addition to brain studies, there are many other ways to invoke scientific methods in the context of Jewish thought. For example, as mentioned above, the definition of God is quite complex. However, it would be fascinating to do either a formal or informal evaluation of the beliefs Jewish people actually hold about God. It would be fascinating if most Jewish people were found to hold beliefs about God that are antithetical to primary Jewish teaching. Or perhaps it would be interesting to determine how similar beliefs about God are across Orthodox, Conservative, Reform, or Reconstructionist Jews.

One way of getting at such a question is to explore related ways in which people express their beliefs. For example, we performed an informal study in which we asked people to draw a picture of God. My colleague and I would do this at various talks and workshops by handing out a piece of blank paper and a pencil. We would give the simple instruction to draw what they thought would be representative of God. We also asked them to describe their drawing in one or two sentences so that we would be sure to interpret the drawing correctly. The results of almost three hundred drawings revealed some interesting findings. For example, approximately 20 percent showed God in an anthropomorphic way, such as a person or face. Approximately 33 percent drew a natural scene such as a forest or mountain with the sun in the sky, or perhaps a picture of the galaxy. Still another third drew something abstract with circles, hearts, or swirling patterns. These results show that only approximately 20 percent of our sample actually conceived of God in some type of humanized form. Most viewed God as a spiritual or abstract essence of the universe. Interestingly, about 15 percent of the pages we handed out were returned with nothing drawn. But these blank pages did contain descriptions of why they were left blank. For the atheists, they left it blank because they did not believe God existed, so there was nothing to draw. On the other hand, some religious people stated that God was "undrawable" and so they left it blank. In much the same way that the name of God is represented as the Tetragrammaton—*YHVH*—in Judaism, God sometimes cannot even be conceived in any kind of human mental process.

A study by a group of researchers at Baylor University evaluated a variety of aspects related to religion and religious beliefs. When it came to the notion of God, the researchers determined from their study that of the almost two thousand respondents, their concepts of God could be placed into four basic categories (although the researchers recognized that people often extended their conception of God over several categories). Their results suggested that the four "types of God" were: authoritarian, distant, critical, and benevolent.

From a cognitive neuroscience perspective, these categories are quite interesting since they span two domains of brain function. One is related to the spatial function in which God is viewed as being either "right here" or very distant. The authoritarian God is ever present and constantly controlling everything that is going on around us. The distant God is viewed as having started

the universe and then essentially let everything else happen on its own. The other cognitive process is related to emotions. Thus, God is either very negative and critical or very positive and loving. The spatial and emotional perspectives on God could also potentially lend itself to brain studies evaluating if the areas that support emotions and spatial processes are actually related to an individual's conception of God.

As mentioned above, the difference between a belief in God that fosters anger and hatred versus one that fosters love and compassion could have substantial implications for the current state of tensions between religious groups around the world. Perhaps we can learn something from neuroscientific or psychological analyses that might help better determine why some people are enticed by highly negative doctrines that espouse hate and violence. And perhaps we might be able to find ways of redirecting individuals down more constructive and positive paths.

Such a categorization related to God might have important implications for Jewish thought as we consider how God interacts with the world and with ourselves. It would be fascinating to try to repeat the Baylor study with an entirely Jewish population to see the similarities and differences with other traditions or within the different denominations.

This general area of neurotheological scholarship might even offer Judaism practical approaches to ancient questions. While the theological interpretation of the Torah would not be changed per se, adding neuroscientific data might provide a new perspective on various questions. As described above, it might be highly useful for rabbis to consider engaging their congregation in questions about the definition of religion and spirituality, the beliefs people have about God, or the nature of free will. Even understanding what traditions, stories, and holidays are the most meaningful and important to people might provide rabbis a useful guide for the development of future liturgy and synagogue programs.

Finally, we might even consider how to utilize neurotheological data to affect future liturgy. In addition to more actively assessing the meaning and value of different rituals, practices, and ceremonies, certain elements of Jewish liturgy might be reconsidered based on current neuroscientific data. For example, current data suggests that the human brain has a working memory capacity of approximately four or five "chunks" of information. This means

that a person can typically remember or work with only a few pieces of information at a time. Thus, long sermons have the potential to minimize their impact since the brain itself can only hold on to a limited amount of information. Keeping sermons short and emphasizing four or five key points are likely to be the most effective and remembered for their impact.

Other data suggests that slowing down speech makes it easier to remember and incorporate into your thoughts and beliefs. In addition, focusing on simple breathing techniques can result in powerful brain changes and experiences. I had an opportunity to utilize this piece of neuroscience data in the context of Jewish prayer. When presenting on neurotheology at a local synagogue, after I described the information regarding breathing and slowing down speech, we decided to perform the *Sh'ma* in a slightly different way. Each word was said using a single breath. Thus, everyone took a deep breath in and recited the next word as they exhaled all the way out. This dramatically slowed the pace of the prayer and allowed people to deeply focus on its meaning. Many people commented to me later on that it was a highly powerful prayer experience.

In conclusion, there are many ways of utilizing neurotheology in the context of Jewish thought and practice. The examples and ideas I have expressed here are only to give a very limited example of the possibilities. There are so many elements of Judaism for which neurotheology might provide a new perspective. The data support the power of various types of religious and spiritual practices. Neurotheology also helps show that concepts of God, religion, and spirituality have a substantial impact on the functioning of the brain. And the brain's abilities and functions affect the way we think about God, religion, and spirituality. Hopefully, neurotheology can provide an important nexus for bringing together the best of what science has to offer with the ancient wisdom of the Jewish tradition.