Neurosycal Theory in The Islamic Intellectual Tradition (Critical Analysis of Historical Dimensions in Psychology)

DOI: https://doi.org/10.18196/afkaruna.v19i2.18499

Jarman Arroisi Arroisi*
Darussalam Gontor University, Indonesia
Corresponding Author: jarman@unida.gontor.ac.id

Tamia Fauziah Latifah
Darussalam Gontor University, Indonesia
fauziahtamia91@gmail.com

ARTICLE HISTORY
Received: 13 May 2023, Revised: 18 August 2023, Accepted: 21 November 2023, Published: 30 December 2023

ABSTRACT
Researchers have widely reviewed the study of neuroscience, but the historicity of this science is not widely known. The rapid development of modern neuroscience cannot be separated from the contributions of Muslim scientists in the Middle Ages. This paper aims to explain the history of neuroscience in the Islamic intellectual tradition and its development to influence Western civilization. For this reason, this paper uses a descriptive-analytical method with library research. The study results show that Muslim scientists such as Abu Zaid Al-Balkh, Ibn Sina, Al-Ghazali Az-Zahrawi, and Al-Razi's contribution to modern neuroscience is impressive and cannot be forgotten. As an example of research on the brain's anatomy and its disorders discussed by Vesalius and Golgi, they refer a lot to books by Ibn Sina, Al-Balkhi, and Al-Zahrawi. Rene Descartes, who discovered the theory of brain physiology, has long been discussed by Al-Razi. Even the introduction of the relationship between brain and brain function was only known in the 17th century and has long been discussed by Al-Ghazali. An original and imaginative thought regarding one of the human body's organs, Muslims are unaware of the extensive research done on neuroscience by traditional Muslim scholars, who were able to bring Islamic culture to its pinnacle in Andalusia and Cordoba. Therefore, it is appropriate to bring the findings back into the study material with full seriousness in the form and fresh face if Muslims want to advance.

Keywords: Islam, Neuroscience, Western

Introduction

A focus on localizing cognitive brain function due to 20th Century discoveries about brain circuits has given rise to a predominately physical perspective on the mind-body debate. The brain is a central nervous system regulating all life activities. The human brain is an essential organ in the human body, it is located at the top of the body, protected by the skull, and functions as a control center to regulate all human movement activities.[1] Accordingly, in this modern era, the brain is used as an object of research study to discover the various potentials in humans. The branch of science that studies the brain is called neuroscience.[2]

In the West, the study of neuroscience has been carried out since the mid-19th century. Research started from the shape of the brain, its cellular structure, and its circuits, which were studied by neuroanatomists. It continued its research on the chemical composition of the brain lipids and their

proteins, which were analyzed by neurochemists (Neurochemists). Some examine the brain's bioelectric properties in their research on the organization and subtraction of nerves and cognitive behaviour studied by neuropsychologists.[3] Until now, neuroscience has become an essential tool for developing educational curriculum programs, especially acceleration, and has produced various brain-based learning theories, such as accelerated learning, brain-based learning, quantum learning, quantum teaching, contextual teaching and learning, and so on.[4]

Due to the depiction of the Mind-Body-Soul in Neuroscience, it is a philosophical topic that receives a lot of attention in Western philosophy. If the development of modern neuroscience is examined in more detail, it is clear that it has absorbed the ideas and theories of other sciences from earlier civilizations. Modern neuroscience tries to explain the connection between the mind, soul, and body, but they can't reconcile physical and non-physical substances. The mind (soul) and body are seen as two distinct entities that cannot be compared in Western philosophical thinking, which developed from Plato through Descartes. Modern philosophers significantly diminish the non-physical aspect of the argument in this example.[5] The Mind-Body dilemma is a philosophical conundrum in the West, involving materialist and dualist discussions. Materialists believe the brain and physical state determine the mind and soul's function, while dualists argue they are separate.[6]

Discussions on Neuroscience also have a track record in Islamic thought. Before Western scientists introduced this science, Islam had discussed this issue, despite a different language and discussion. For example, in the field of brain anatomy, this has been studied by Muslim surgeons, such as those carried out by, Abul Qasim Az-Zahrawi (Abul Cases), Ibn Zuhr (Avenzoar), and Ibn Maymun (Maimonides). And many more Muslim surgeons explore the brain's performance with mental function in a neuroscience approach.[7]

Wordy, the study of symptoms caused by nerves of the brain, to the way of recovery (which was carried out by previous Muslim psychologists) in the heyday of the Muslims at that time (enlightenment of Islam). In addition, the study of neuroscience in Islam focuses on empirical studies and is related to magical things (fitrah, spirit, qalb, nafs, and aql). It is mostly done by Sufis, psychologists, or Muslim psychiatrists such as Al-Ghazali, Al-Farabi, Ibn Sina,[8] Al-Balkhi,[9] and Fakhruddin Ar-Razi.[10]

According to Islamic psychology, the soul is a spiritual substance that reanimates and prepares the body for knowledge, and the mind and body are interviewed creatures.[11] The relationship between psychological processes and the human brain is highlighted in Ibn Sina's book Al-Shifa, emphasizing how crucial this relationship is to Islamic psychology.[12] Al-Kindi highlights the relationship between Islamic psychology and the brain, claiming that this philosophy is based on the brain.[13]

The understanding of the brain in Islam is not fixed on a miraculous organ that can store memories on a large scale, but the brain has unity with the soul and human mind. Connection with the above discussion invites several opinions from scholars. This is evidenced in several literature reviews that the brain is a physical form of reason. And some say that the brain and the mind are two different forms. Faiz Rofdli, in his article, said that reason is the only function of the brain.[14] In this interpretation, Rofdli agrees with Moh Zaidi. His book presentation discusses the relationship between mind and brain as a relationship between the body and the spirit, the mind as the spirit, and the brain as the body.[15] However, Harun Nasution's view is different. According to him, the brain and reason are not one unit. The mind (reason) is not the brain but the thinking power contained in the human soul.[16]

Research conducted by Rofdli with the title, "*Tafsir Ayat- Ayat Neurosains ('Aql Dalam Al- Qur'an dan Relevansinya Terhadap Pengembangan Berpikir Kritis dalam Pendidikan Islam)"*, this study is a literature review with a qualitative approach. Results of this study indicate that the interpretation of

neuroscience verses can be traced through the concepts of tafakkur, tadabbur, ta'aqqul, and so on. The results of this study also have implications for the paradigm of Islamic education, which was initially only oriented to the development of dichotomous qalb-based morals to develop the potential for critical thinking of students who are more holistic with a more scientific approach.[17]

Research conducted by Citra Trisna et al.[18] under the title *"Neurosains Dalam Pembelajaran Agama Islam"* is a literature review with a qualitative approach. The results of this study analyze several reasons why Islamic education does not pay attention to neuroscience, which has implications for the separation of IQ/EQ/SQ. First is the loss of Islamic educational philosophy. Second is the dichotomy of scientific development. Third, Neuroscience has not received attention in Islamic education. The other cause is the lack of attention in Islamic education to the development of neuroscience.

The research conducted by Ahmat Miftakhul Huda and Suyadi applied a qualitative approach in the form of a Creswell model of literature research. The results of this study indicate that if humans use their brains and minds to think properly and correctly, then these humans will provide and create new ideas for solving various problems. Moreover, humans know more about the brain and are naughty; humans will further increase their faith and devotion to Allah for His extraordinary creation.[19]

Method

This study was qualitative. One element of qualitative research is to use an approach.[20] The type of approach used in this study is philosophical analysis. This philosophical approach is used to express and clearly formulate the concept of thought of muslim and Western scientists.[21] This research is a type of pure research because it is intended for the development of science.[22] Based on the place of research, the type of research in this article can be categorized as library research. According to Mary W. George *(library research)* entails locating sources of factual information or asking experts about research.[23]

The researcher analyzed the data using descriptive approaches designed to handle data when characterizing a community's status methodically.[24] Data analysis is done carefully and clarified according to the required variables.[25] Also, this study applied the monotheistic scientific model, a school of thought, and its impact on a group's attitudes and viewpoints. Lastly, the data analysis utilized descriptive methods.[26]

See the following table to see the development of neuroscience in the history of Islamic and Western traditions.

Table of Neuroscience Development in Islamic and Western Traditions

No	Muslim figures	Science Specialization	Western character	Science Specialization
1	Abu Zayd Al-Balkhi (849-934 AD)	Neurotic Disorder, Cognitive Therapy	Andreas Vesalius (1514-1564)	Neurotic Disorder, Neuroanatomy
2	Ibn Sina *Avicenna* (980 AD)	Neuroanatomy, Neurophilosophy	Santiago Ramon Cajal (1852-1934)	Neuroanatomy, Neurotic Disorder
3	Al-Ghazali (1058-1111)	Neuropsychology	-	-
4	Al-Zahrawi *Abulcases* (930-1013 AD)	Neuroanatomy and Technical neurosis surgery	Camilo Golgi (1843-1926)	Neuroscience Technology
5	Fakhruddin Ar-Razi (1150-1210 AD)	Neurophysiology	Rene Descartes (1596)	Neurophysiology

Islam and the History of Neuroscience Development

Before the West knew neuroscience, Muslims had known it first. Various things about the brain have become a long discussion in Islam, including definitions, anatomy, physiology, and symptoms of diseases in the brain, among others. This has been discussed for a long time. In Islam, the discussion of the brain is often associated with the mind, soul *(nafs)*, and heart *(qalb)*. Intellect Islam is seen as a substance with two meanings: the brain as a (material element) and reason as well as the soul as a (spiritual element).[27]

The Phenomenon of Intellect and Brain in Islam is a research carried out gradually from time to time. According to Muhammad Izuddin Taufiq, "*The brain is an ambiguous body part that still surrounds the human body because it is a place of thinking related to the spirit or soul, while the spirit or soul is something ambiguous*".[28] Thus, it is unsurprising that some Muslim scholars equate the brain and reason, and some distinguish them. Harun Nasution is one of those who deny the similarities between the brain and the mind. He asserted, " *In Islam, the reason is not the brain, but the thinking power contained in the human soul, the power described in the Qur'an, acquires knowledge by paying attention to the natural surroundings*".[29]

Several peripatetic Muslim Muslim philosophers, such as Al-Kindi, Al-Farabi, and Ibn Sina. Muslim scientists who have explored the brain's performance related to the function of the soul in this anatomical approach, such as Al-Balkhi and Fakhruddin Ar-Razi. Consequently, we will review this again to remind us of the history of science in the past.

It should be noted that before the West developed this neuroscience, many Western people experienced various difficulties in the Dark Ages. In this dark era of Western civilization, they were stricken with ignorance for centuries and had problems reading and learning Greek, the science language. To reawaken Europe, which had been in its long intellectual slumber, they had to translate all kinds of texts from Syriac to Arabic and finally to Latin. According to Stanley Finger in his book "Minds Behind the Brain", the search for European intellectual sources at that time began with translating critical medieval texts, especially those related to neuroscience.

Definition of the brain according to Muslim scholars

Starting from the basis of the discussion of neuroscience in Islam, it can be seen that you should know the definition of the brain that several Muslim scholars have argued. First, Al-Kindi (801-806 AD) defined the brain as the centre of all feelings and all sensory nerves. The brain can be analogized to Al-Kindi 's Birth Intellect (in language). It is called the birth mind because, in addition to functioning to understand rational things, it can turn that rational understanding into an action (fi'il al-mustafad). The second definition comes from Abu Bakr Ar-Razi (864-925 AD). The brain (brain gland) is a tool or device used by the rational soul; according to Ar-Razi, the brain has a high position because the senses, cold motion, imagination, and the process of thinking and remembering come from the brain. Therefore, the brain, in Ar-Razi's view, is part of the rational soul (An-Nafs an- Nathiqah Al-Divineyah). The brain and soul are a unified whole. They were then followed by the opinion of Al-Farabi (872-950 AD), as quoted by Fikri Suadu, that Al-Farabi established the brain as the most important organ for humans after the heart. In addition, according to him, the brain is an executive organ that plays a role in managing and distributing all these natural forces throughout the faculties of the soul and organs of the human body through the connectivity of the nerve fibres it has.[35]

TRACK OF NEUROSCIENCE IN ISLAMIC TRADITION

To find out the efforts and progress of Muslim scientists in studying neuroscience to produce a proud intellectual property that does not appear to be modifying the subject, can learn the following discussion:

Al-Balkhi's Thought Was on Neuroscience

Al-Balkhi is a Muslim scientist who introduced Islamic psychology and neuroscience around the 9th century. Abu Zayd Al-Balkhi has been described as the first mental pioneer in a previously concerning physical health field. He is a scientist described as multitalented in several fields and specializes in psychology, neuroscience, and cognitive science. Although there is also a topic on neuroscience in work, the discussion is quite different because the concept of neuroscience relates to the spiritual dimension of man, namely his relationship with God and other metaphysical things, in contrast to modern studies, which have prioritized purely scientific/anthropocentric studies in human studies to exclude spiritual aspects.[37]

It is a great and unique contribution based on Tawhid (Unity of God). Various explanations regarding the topic of the nervous system in the brain, the classification of neurological diseases of the brain (neurosis), and his healing efforts using spiritual healing have been described in his book Mashalihu-L Abdan Wa-L Anfus. The healing of neurological diseases (neurosis) is focused on the physical but touches on treating the soul (nafs).

The description of Al-Balkhi's genealogy or biography is contained in Mu'jam Al-Aduba's book in this book, and it is said that Al-Balkhi was a Muslim intellectual who mastered various classical and modern sciences in the 9th century. The character, usually called Al-Balkhi, has the full name of Ahmad Ibn Sahl Al-Balkhi Abu Zayd. He was born around 235 AH (849 AD) and died in 934 AD at around 87/88 years.[40]

Among the fields he mastered were Ulum Al-Qur'an, Kalam, astronomy, literature, and philosophy. However, from some of his works (or about 60 books), today we only have the book Suwar Al-Aqalim, namely his book in the field of geography and the book Masalih al-abdan wa al-anfus in the field of psychology. Meanwhile, Mahmud Misri's book mentions that Al-Balkhi has approximately 64 books, as Abu Hayyan and Fakhru-Ar-Razi quoted.

Al-Balkhi was born in a small town called Syamistiyan, Balkh region (Bactra), and is now in Afghanistan. His father educated Al-Balkhi, and his father's profession was a children's teacher. Al-Hamawi did not mention Al-Balkhi Childhood, but he was one of his students, Abu Muhammad Al-Hassan Al Waziri. His teacher is a person who is not too tall, his skin colour is brown, and he has a shy and quiet personality. His personality gave rise to a moral nature. This made him a closed-off but brilliant scholar. He prefers to be alone rather than socializing a lot with his friends.[41]

Al-Balkhi grew up in Baghdad for 8 years when Islam was under the decline of the Abbasid State, and its territory only covered Baghdad and its surroundings. And at that time, there was also political chaos, so riots were everywhere. Even though Baghdad was being hit by destruction, Balkhi did not use it as a barrier to be continuing the tradition of knowledge that he had mastered. And he appeared as a lamp in the darkness. Al-Balkhi emerged as the first psychological figure to discover the science of cognitive and medical psychology (cognitive and medical psychology). He was the first to distinguish between neurotic disorders and the pioneers of cognitive therapy to study the classification of these disorders.[43]

Based on the discussion in Mashalihu-L-Abdan Wa-L-Anfus's book, he gave a sign to explain the notion of neuroscience in his view, namely: The study of neural network molecules that are directly related to human behaviour and science, complete with diseases. The focus of the first discussion did

According to Al-Balkhi, this disease caused by nerves relates to mental-psychological conditions. Therefore, from the results of his research, he classifies 4 psychiatric mental disorders: *fear and panic,* anger and aggression, sadness and *depression, and obsession* or thought disorder.[44]

Avicenna And the Development of Neuroanatomy and Neurophilosophy

His full name is Abu Ali Husayn bin Abdullah bin Hasan bin Ali bin Ibn Sina. Born in the month of Shafar 370 H, or around August-September 980 AD in Afsyanah. In the West, she is known as Avicenna. Ibn Sina has a very special personality. This advantage was able to exceed other scholars at that time. He has a sharp brain, which all experts have acknowledged, and a strong memory is also a strength among the scientists of his time. All this is proven by many fields of knowledge ranging from religious science, philosophy with all its knick-knacks, political science, and medical science.[46]

Ibn Sina's thought, closely related to Neuroscience, is in the concept of multilevel reason. According to Uthman Najati, Ibn Sina's theoretical reason has several levels (stages) potential Intellect, talent/possession sense (Al-A'ql Bi-L Malakahh), actual reason (Al-A'ql Bi-L Fi'li), and mind taking advantage (Al A'ql Al-Mustafad). In this case, Ibn Sina has a more theoretical concept of neuroscience. It is mentioned that way because Ibn Sina has a metaphysical and philosophical framework of thinking.

Suya cites Taufik Pasiak in explaining its function. First, the actual mind is a potential of the brain, and everything is made possible by the presence of the Creator of the brain. The active mind is also often called the essential brain because it thinks about crucial things, such as: "Why was the brain created for? This essential brain or active mind thinks hard to answer essential questions and leads to the conclusion (answer) that the brain can relate to God.

Then Taufiq Pasiak concludes from the above explanation, meaning God has entered the human mind through this essential or actual brain. The discovery of this amazing thing was then published by scientists and stated, "God in the human brain". That is, thinking about God (including worship and prayer) has neurobiological traces in the human brain, which has been scientifically proven.[49]

In this regard, Ibn Sina said that the brain is one of the vital organs and principles whose emergence develops from the heart and is necessary for every individual's life. The brain is composed of nervous systems that are continuous with one another; they are white, soft, flexible, difficult to tear, and are created to serve sensation and movement of the limbs. Nerves are structures that arise from the brain or spinal cord. It places the brain as the center of mental faculties, sensations, and movements. Ibn Sina explained that the brain receives its natural forces (power of life, innate heat, breath) from the heart, and then the brain acts as the initial starting point that transmits these forces to other body organs via nerve fibers.[54]

Nerve fibers are important body structures related to sensation and movement; these nerve fibers or several nerve fibers mediate this function. According to Ibn Sina, nerve fibers are an independent source of strength. These nerve fibers function to relate or connect the brain, muscles, and other organs and body parts. Regarding the correlation of the brain with the faculties of the soul, Ibn Sina clearly states that all capacities related to internal sensations, including the rational function of the human soul, are located in certain parts of the brain.

AL-GHAZALI'S NEUROPSYCHOLOGY

Al-Ghazali (1058-1111), his full name is Abu Hamid Muhammad bin Muhammad Al-Ghazali, popularly called Hujjatul Islam. Born in Thus, in the year 450 AH / 1058 AD, a quarter of a century after the death of Ibn Sina. His thinking related to neuroscience is in the discussion of the power center of

internal sensation. Here, Al-Ghazali establishes the brain as the center of the power of internal or inner sensations; in this argument, he agrees with Ibn Sina in his work entitled (Al-Qanun Fi Ath-Thibbi, An-Najat, and Ahwal An-Nafs). In Al-Ghozali's view, the collective sense center is on the first side of the inner forebrain, while the conceptual power center is on the back side of the first interior of the brain. Then, the fantasy power is in the first part of the midbrain.

The power of fantasy uses the whole brain as a tool. According to Al-Ghazali, one part of the brain is most important, called the midbrain. The midbrain is at the back, where there are memories, and memories at the end of the mind are divided into material reason and the spiritual mind (ruhaniyah). According to Ibn Sina, the bodily mind or the brain is the substance of the perceiving power from within. Ibn Sina, a classical Muslim philosopher, detailed the division of the whole brain with its functions. He divided the brain into 3 parts, namely: the forebrain called (al-his al-musytarak), the midbrain (al-khayala), and the last one (Al-Hadjizah), an explanation of these parts of the brain equipped with functions of each of these sections.[57]

First is the part of the forebrain, which he refers to as (Al his Al-Musytarak); this part has the function of receiving impressions from the outer senses and transmitting them to the other inner senses. Second, the midbrain (Al-Mutakhayulah) this section regulates the images that have been released from these materials by separating and connecting them. Third, the midbrain, called Al-Wahmiyyah. grasps the meanings contained in the images. Third, the back of the brain, called (Al-Hadjizah) functions as a store of meanings captured by the senses of the responders.

In another study, it was said that Al-Ghazali distinguished the brain from fitrah, spirit, qalb, nafs, and aql in the study of Islamic psychology. According to him, the metaphysical concepts in Islam that have been described in two meanings are: 1) biologically and 2) metaphysically. According to Suyadi, the divine, metaphysical concepts by Al-Ghazali are very useful for developing modern science related to neuroscience because if the brain as mind (human thinking power) is maintained, then the fitrah, spirit, qalb, nafs will also be preserved.

NEUROANATOMY AND TECHNICAL NEUROPERATIVE AL-ZAHRAWI *(Abulcases)*

Some Muslim scientists come from Andalusia (currently Spain). One of which has intelligence in several scientific disciplines (multidisciplinary scientists) and is dubbed as the father of modern surgery. His works are still used as the basis for the development of science in the West. He is Al-Zahrawi (930-1013 AD), better known by the name (Abulcasis) in Latin. At the end of the first millennium, Al-Zahrawi discovered the optic nerve and succeeded in mapping the centers of other brain nerves. In addition, he also succeeded in performing surgery on the brain to find diseases or neurological disorders in the human brain and providing a solution to the disease by developing materials and technical designs to dissect the nerve. Al-Zahrawi developed many materials and techniques that are still used in neurosurgery.

NEUROANATOMY AND TECHNICAL NEUROPERATIVE AL-ZAHRAWI *(Abulcases)*

Some Muslim scientists come from Andalusia (currently Spain). One of which has intelligence in several scientific disciplines (multidisciplinary scientists) and is dubbed as the father of modern surgery. His works are still used as the basis for the development of science in the West. He is Al-Zahrawi (930-1013 AD), better known by the name (Abulcasis) in Latin. At the end of the first millennium, Al-Zahrawi discovered the optic nerve and succeeded in mapping the centers of other brain nerves. In addition, he also succeeded in performing surgery on the brain to find diseases or neurological disorders

in the human brain and providing a solution to the disease by developing materials and technical designs to dissect the nerve. Al-Zahrawi developed many materials and techniques that are still used in neurosurgery.[62]

FAKHR AL-DIN AL-RAZI BRAIN PHYSIOLOGY

His full name is Abu Abdullah Muhammad bin Umar Husain bin Hasan bin Ali At-Taimi Al-Bakri; he is known as Ibn Khatib Ar-Ray. He was an Islamic reformer at the end of the 6th century Hijriyah and the greatest thinker born after Imam Al-Ghazali. He was born in the city of Tehran (Iran) in 544 H / 1150 AD, and some say the year 543 H. The thought of Fakhr Al-Din Al-Razi (1150-1210 AD), which is closely related to neuroscience, is in his work entitled Al-Firasah; more specifically, the topic of conversation is focused on the concept of brain premonition (phrenology). Moreover, in Jiwa Dalam Pandangan Filsof Muslim Uthman Najati provides information about Ar-Razi's concept of phrenology; from his statement, it is known that the science of brain hunches is a science that discusses the relationship between the shape of the skull and the ratio.[63]

He distinguishes between ideal and less ideal head shapes in his presentation; the following are the results of Ar-Razi's analysis of the potential of the human brain: the ideal head shape is the presence of bulges on the front and back indentations on the right and left sides. At the same time, a rectangular head shape or too prominent is a head shape that is not good or less than ideal, except for the power of conception.[64]

In his book, Al-Firasah Ar-Razi also said that understanding the condition of the brain can be done by understanding the condition of the eyes, tongue, face, throat, shoulders, neck, and arms. For example, dryness of the brain is indicated by dryness of tears, and Ar-Razi also finds out the condition of the brain through eye movements, such as anger, daydreaming, fear, and so on.[65]

REASON AND BRAIN AND THEIR RELATIONSHIP

Among Western thinkers lately, it seems that they tend to separate themselves from spiritual things and instead attach themselves to things that are materialism or physicalism. In any science, the trend of dichotomy science has taken root in the West, including understanding the mind and brain. The Intellect (Intellect, mind) is a spiritual organ, and the brain is a physical organ. Between the spiritual and the physical, there is a close relationship. In line with Descartes' opinion, he emphasized that "Soul and Body are not two independently related entities, but they influence each other. In Islam, we already know that the highest source of knowledge is the Qur'an, which was then supplemented by Al-Hadith (Sunnah of the Prophet Muhammad). For this reason, it is appropriate for Muslims to believe that the (physical) of humans is impermanent and will surely perish, and the spirit will continue the next human life.

Some Muslim scientists argue that the mind has a close relationship with the brain, and some explicitly explain that the brain has nothing to do with reason. In the first opinion, the study of the brain in Islam is not only focused on empirical studies, but it is related to metaphysical things (fitrah, spirit, qalb, nafs, and aql), following the discussion of Islamic psychology. Talking about the brain and the mind, the Qur'an has a broad scope about Intellect and the brain, as explained in the Qur'an Surah: Al-Imran: 190-191. It explains that intelligent people combine the functions of reason and mind. In neuroscience, it's called the Cortex, and feelings (limbic system) are maximized so that when they gain confidence (high conclusions in the form of a system in the form of Kaimana), they will vibrate the heart (qalb), which is in the chest.[69]

According to Zaidi Ismail, before knowing the relationship between the mind and the brain, we should first understand the principles of the relationship between the mind and the brain; in his book, he explains at least 3 important points: 1) The Nature of Man. Zaidi explained that if we know the nature of this human being, it will be found in it a special relationship between the soul and the body. Zaidi Ismail's argument is derived from several explanations by previous Muslim scholars. 2) The nature and nature of cause-and-effect relationships. In this case, Zaidi explained that this causal relationship is a series of collective behavior that occurs according to the knowledge and will of God, Allah SWT. 3) Types of events-behavior. This last principle means that all events in mind and brain should be re-discussed in their scope or based on the type of behaviour event, namely *fi'il, iradi, and ikhtiyari*.[70]

The mind and brain in the human body are part of the soul. Earlier Muslim scientists have long expressed this opinion. In thinking activities, the brain is an external organ that humans use. Naturally, someone equates the meaning between the brain and reason as an organ used for thinking. However, this does not mean that this Muslim scientist does not intend to understand that the peak of the reason is in the brain, which is part of the human body. On the other hand, according to them, the reason is the real agent for all kinds of human activities, and the brain is only a tool or vehicle. According to Muh. Daming, reason is the greatest gift given by God. Therefore, reason must be able to function properly.[73]

Some figures, such as Al-Ghazali, and Toshihiko Izutsu, have different opinions about the mind and brain. They even distinguish the mind and the brain. In their opinion, they tend to imply that reason is a work of the soul (qalb, spirit, and nafs), while Izutsu implies that historically pre-Islamic reason was the cognitive work of the brain. Al-Ghazali (1508-1111) states that time is not located inside or outside the human body, is immaterial, and is not divided. Al-Ghazali also explained that there is a relationship between the mind and our bodies but did not mention that it is the brain. Instead, he explained that reason is related to the body in the form of 1) muqbil ala al-Badan (facing the body), mufid lahu (giving profit), and mufid a'alaih (flowing to it). These three characteristics focus on functions, processes, or activities. Then Al-Gahzali emphasized that in the usual sense, the mind is in the brain, while feelings are in the senses, and the will is in the soul.

Another character mentions the relationship between reason and the brain, Toshihiko Izutsu, who associates reason with practical intelligence or binding and restraining is the word's basic meaning. According to Izutsu, in this regard, the meaning is more suitable and closer to logical reasoning activities after he analyzed several meanings of reason from various languages. 'Aql here is more likely to be called reason (English), ratio (Latin), verstand (German), and Dianoia (Greek). A vertical pattern of left brain work procedures has been formed.[76]

So, it is necessary to know again, after examining some of the thoughts of these Muslim scholars, that Intellect in the Islamic sense is not the brain, but the thinking power contained in the human soul, the power described in the Qur'an. The way humans acquire knowledge is by paying attention to their natural surroundings. Thus, the intellect sense is contrasted in Islam with a revelation that brings knowledge from outside man. Keep in mind that the brain is only a tool that helps the mind describe an action carried out by humans; in general, the brain will not work if it is not regulated by reason.

Modern Neuroscience

The brain is a miraculous organ that stores life memories. Some even claim that the brain is a central organ for the development of modern human civilization and can enrich new knowledge now. According to Greek philosophy, the power of thought is found in the soul-centered brain. In this case, Descartes said that the reflection of human thinking is a work process controlled by brain functions that

develop from interconnected networks in the brain. In the next period, after the ancient Greek civilization, the development of medical science in the study of humans became more objective when the medical science activists mastered Fa'al Science (anatomy) and participated in developing psychology. Among them is Wilhelm Wundt, a German doctor who proposed the theory of dualism between body and soul. Also, Roger Wolcott Sperry from the United States proposed the theory of the right and left hemispheres of the brain. So this is what invites modern-contemporary scientists to uncover the brain's secret and begin mapping the brain. This brain mapping attempts to see the relationship between brain structure and function.[81]

The origins of modern neuroscience can be traced back to the early 1890s. Scientists who were serious about studying the anatomy of the brain determined that the nervous system was made up of cells. Etymologically, neuroscience is a neural science that studies the nervous system, especially neurons or nerve cells, with a multidisciplinary approach. The range of neuroscience has expanded its knowledge network by following various scientific experiments carried out systematically and theoretical investigations of the central nervous system and the peripheral nervous system of biological organisms. The empirical methodologies used by neuroscientists today are evolving rapidly. His research ranges from molecular and cellular studies to individual nerve cells, photosensors, and brain motor levers.[84]

Research on the brain and the nervous system in it has amazed the world's great figures, such as President George. W. Bush supported research on the brain, the climax admiration he announced in 1990 as the "Decade of the Brain", exactly 100 years after the birth of modern neuroscience. Several other organizations are also often created by several other scientists and run to this day, such as the International Barin Research Organization, founded in 1960, the International Society for Neurochemistry in 1963, the European and Behavior Society in 1968, and the Society for Neuroscience in 1969.[88]

Suyadi, in his book, explains that there has been an integration between neuroscience and education marked by several decades. First is the brain decade. It was discovered in the 20th century that simultaneously, there was a bubbling wave in Paris, Tokyo, and Cambridge to bring neurology and cognitive science (cognitive psychology). Bruno Della Chiesa created a brain-based learning project (brain research), which later launched 2 science books and learning brains. In Tokyo, Hideaki Koizumi launched a movement to link biology and education, which was then implemented into various longitudinal studies of the learning and development of the Japanese language for children. At Cambridge, Kurt Fischer and Howard Gardner started a program to link the mind, brain, and education (mind, brain, and education). Second, brain development in early childhood develops rapidly, up to 85%. Third, the theme of "education and neuroscience" is gaining important momentum as the paradigm and learning approach changes from indoctrinating to a scientific approach.[89]

Etymologically, neuroscience comes from two words: neuro and science. In contrast, the word neuro means the nervous system. Science means science in another sense: neural science, which studies the nervous system, especially looking at neurons or nerve cells with a multidisciplinary approach. Neuroscience studies how the nervous system develops, its structure, and what it does. His research on Neuroscience is focused on cognitive function. In addition, neuroscience is an area of study that seeks to understand how the mind and brain develop together.[91]

Modern science has been able to track the shape of the brain in detail; the results of this scientific research state that the size of the human brain volume is about 1350 cc, which includes 100 million nerve cells (neurons), which makes the brain look solid and solid, to the human brain. Function follows its role and becomes the center of all human activity. The basic principles of neuroscience are intended

to provide a fundamental understanding of the workings of the human nervous system. The nervous system's workings will impact human behavior and brain knowledge development. The main goal of neuroscience is to study the biological basis of every behavior, which means the main task of neuroscience is to explain human behavior's point of view of the activities that occur in the brain.[93]
Since neuroscience is a branch of science that studies the nervous system, it has to do with neural connections that have existed for a long time. The topics studied are structure, function, evolutionary history, development, genetics, biochemistry, physiology, pharmacology, informatics, computational neurology, and neuropathology. In addition, neuroscience is a growing field of biology, including the study of psychology *(cognitive science and psychoneurology).*[94]

The scope of neuroscience lies in its studies in several dimensions: a) Cellular- Molecular. The scope of this study is to study various kinds of nerve cells and describe the various functions of these nerves, specifically, to produce complex behaviours, such as emotions and ratios, that form a single unit in the neural network of common sense. b) Nervous system examines nerve cells that function together in a complex system; for example, vision problems are studied in the visual system, movement problems are studied in the motor system or kinesthetic system, and hearing problems are studied in the auditory system. c) Behavioral Neuroscience (Neuroethics) examines how the various systems work together to produce certain behaviors. For example, how the optic, auditory, and motor nerves process information simultaneously (even if only one particular action or behavior. d) Finally, social neuroscience (Socioscience) studies how the human "social brain" plays a role in helping humans form relationships with other people.

We need to know the purpose of developing neuroscience in the West. Following the philosophy of science in the word neuroscience, it is a scientific process. Simply put, neuroscience is a process of scientifically discussing the nervous system and the human brain as both the meaning and purpose of studying neuroscience. For example, *1) cognitive and thinking, 2) memory and memory, 3) socioemotional, and 4) abnormalities or disorders of the nervous system and brain. 5) The mechanism of action of nerves in the brain, 6) The process of science and relationships with other systems.*[96]

THE CONTRIBUTION OF WESTERN SCIENTISTS IN THE DEVELOPMENT OF MODERN NEUROSCIENCE

Genetics, dermatoglyphics, developmental psychology, and neuroscientific studies (on the brain and its functions) all support the interpretation and help us understand who we truly are. Almost all studies demonstrate that every brain functioning and behavior has biological roots. In other words, neuroscience researchers found that the human person came with a "manual book". Neuroscience in the West, rooted in Aristotelian philosophy and the Cartesian revolution, has experienced slow growth and conceptual challenges in understanding the biological basis of traits distinguishing humans and other animate beings.[98]

Regarding the brain, sophisticated tools found by modern scientists have estimated the brain's weight, around 1350-1400 grams or approximately 2% of body weight. In Western medicine perspective, the weight of the brain and the size of the head never have anything to do with the level of intelligence. The brain at the top of this body is divided into 3 main parts, namely: First, the Big Brain (Cerebrum), which has a function in regulating all mental activities, namely those related to intelligence (intelligence), memory (memory), awareness, and consideration. The second is the midbrain (midbrain mesencephalon), located in front of the cerebellum and the carol bridge. Third, the thalamus in front of the midbrain and the pituitary gland regulates the work of the endocrine glands. Finally, the midbrain's

upper part (dorsal) is the optic lobe, which regulates eye reflexes such as the constriction of the pupil of the eye and is also the center of hearing. Moreover, the midbrain, pons, and medulla oblongata are referred to as the brainstem. The midbrain is the shortest part of the brain and functions as a conducting pathway and reflex center. The third is the cerebellum, which coordinates muscle movements that occur consciously, continuity, and body position.[100]

ANDREAS VISALIUS: NEW HUMAN NEUROANATOMY (1514-1564)

Andreas Vesalius is a professor of anatomy in Padua. His career as a surgeon is considered to be able to destroy Galen's basic ideas about the anatomy of the human brain. At 28, Vesalius published his famous book, " De Humani Corporis Fabrica " (On Workings of The Human Body), one of the most important books in medical science. Inside there are 25 extraordinary illustrations that present the complete anatomy of the human brain and its parts. In addition to writing about brain anatomy, Vesalius also discusses brain disorders. Then, he also explained the miracle ventricle and rete, which are the basic structures of galenic physiology. However, from his research on Galenic physiology, he was confused with the anatomical structure of the brain that he made and could not explain how the brain might regulate the function of the rational soul. As the following expression:

"I can follow the brain's functions in a dissection of living animals, with sufficient probability and truth, but I am unable to understand how the brain can perform its office imagining, meditating, thinking and remembering, or following various doctrines", Thomas Aquinas wrote".[102]

RENE DESCARTES: PHYSIOLOGY OF THE BRAIN (1596)

Descartes was born in the small town of La Haye in 1596; his mother died when he was 13 months old, and was then raised by his father, Joachim. His father also took care of and supported Descartes alone. With his intelligence, Rene Descartes grew up as a philosopher of the century 17 who developed a system to explain how the nervous system works. He was not a medical expert, but he mastered the fields of geometry, physics, and mechanical models to explain his ideas. His name is Rene Descartes. He strives to understand the form of the body in all its glory. Descartes asked himself before pursuing neuroscience, "How can brain activity explain various behaviors such as scratching insect bites and memorizing books? "From here, he began to observe the workings of the brain, resulting in a theory of brain physiology that covers all fields, which goes far beyond observable research.[103]

In his research in brain physiology, he still believes in animal spirits as the ancient Greeks believed. According to Descartes, the pineal gland is innervated by the sympathetic nervous system and can function as a photoreceptor. Furthermore, he assumed that the nerves from the sensory organs to the brain contained fine filaments in their long tracts. He thought that, when pulled at the end, these threads would open tiny valves in the walls of the ventricles, allowing the spirit to enter the nerves and then flow into the muscles. In addition, he also explained that the pineal gland could sway or tilt to direct the flow of the spirit toward specific openings created in the walls of the ventricles. Descartes also concluded that the pineal gland is the most likely candidate to assume an important control function in humans. This is analogous to his belief that the human soul should have a well-defined operational center in the brain that can control the movement of spirits through the nervous system. Descartes describes dreams in sleep, which are tracked through the nerves in the human brain.

CAMILO GOLGI: TECHNOLOGY OF NEUROSICS (1843-1926)

After knowing the structure of the human brain, modern scientists developed research on the brain and its nervous system using the technology they made to make it easier to track nerves. With this staining method, a scientist could observe pathways in nerve cells in the brain for the first time. In addition, Golgi also succeeded in discovering the reazione near method (black reaction) in 1873. The scientist who was instrumental in facilitating this research was Camilo Golgi, whose idea he was able to invent the microscope and the development of cell staining procedures, which began in 1886. He used silver material achromats to understand the complex structures of human nerve cells. Camilo Golgi was born in 1843 in a small village in the Alpine valley south, north, and east of Milan, in the then city of Lombardy. His father was a doctor who moved his family to another village near Pavia.[108]

SANTIAGO RAMON CAJAL: FROM NERVOUS NETWORKS TO THE NEURON DOCTRINE (1852-1934)

Then, after Golgi, some scientists are trying to understand nerve cells in more detail. One of them, Santiago Ramon, focused on neurons, Santiago Ramon. Y. Cajal is the father of modern neuroscience, a neuroanatomist who has produced over the past 5 decades more than 20-900 images that reveal the nervous system. He won the Nobel Prize in 1906; this award was given for his discoveries, which are considered amazing. His most important discovery about the brain was when he championed the Neuron Doctrine, which stated that the brain is composed of discrete neurons rather than a continuous network of cellular complements. The last theory of kajal that played an important role in the mid and late 19th centuries was the reticular *theory of the brain*.[109] This theory convinced many scientists in that era that the brain consists of a large network of continuously interconnected cells. A brief description of his findings is:[110] 1) Nerve cells (neurons) are the smallest units of the brain that function to produce communication signals. 2) The axon terminal conveys information to the dendrites of other cells in a section called the synapse, which is the gap between the axon and the dendrites of other cells. 3) Neurons form synapses and communicate with certain nerve cells only. Neurons consist of 3 types: 1) sensory neurons, motor neurons, and interneurons. 4) Signals in neurons travel only in one direction, namely to the dendrites to the cell body, axon, presynaptic, across the synaptic cleft, and the dendrite of the next cell.

The next contribution came from Luigi Galvani in the 20th century; his research discovered the electricity of muscles and neurons. Similarly, what has been done by Emil Dubois Remind, Johannes Peter Muller, Ricard Caton, and Hermann VOB Helmholtz found an electrical stimulation of neurons which further strengthens the understanding of the working mechanism of the nervous system in the brain in studying mental performance.[111]

Neuroscience research then expanded with more and more things to be known, and dissatisfaction with this scientific research became more and more rampant. Theoretical investigation of biological organisms' central nervous system and the system. The empirical methodology used by Western scientists, especially neuroscientists, is developing rapidly and rapidly from the molecular and cellular

CONCLUSION

Neuroscience, which is considered a new finding in the West, which emerged around the 17th-20th century, turned out to be an ancient science that has been studied by Muslim scientists in the Middle Ages, such as Ibn Sina, Al-Farabi, Al-Kindi, Al-Ghazali, Abu Zayd Al-Balkhi, Fakhrudiin Ar-Razi, and many more. Although their time was not yet known as neuroscience, they had made extraordinary discoveries

about the human brain. The study, which started from the brain anatomy described by Ibn Sina and Az-Zahrawi, has attracted the enthusiasm of people living in modern times, such as Wilhelm Wundt and Roger Walcott. Unfortunately, they lived centuries after the life of the peacock.

Then, another historical trace, the discovery of the connection of the nerves of the brain and limbs that Cajal found in the modern century, was discussed by Abu Zayd Al-Balkhi in the 9th Century AD. Abu Zayd Al-Balkhi has explained in detail neurosis and psychology. His cognitive skills, complete with his descriptions of neurological diseases, which he could cure only with the spiritual healing method he discussed in his book Mashalihu-L Abdan Wal-Anfus. Then followed by scientists in the 16th century, such as Vesalius, Rene Descartes, and Thomas Wills, who also contributed to researching the brain related to the relationship of the soul.

Understanding psychology through this brain anatomy approach was then discussed by Sufis such as Al-Ghazali, Al-Kindi, and Al-Farabi. From here, the Muslim leaders became the forerunners of the development of neuroscience in the West. Most Western people study ancient Muslim manuscripts to be used as a basis in the process of developing their thoughts. However, they forgot the role of Muslim scientists who translated many ancient Greek texts into Latin and influenced the opinions of medieval European thinkers to the beginning of the modern European Renaissance. In terms of science, Muslims are not only engaged in scientific research but also carry out metaphysical research and seek to integrate it. That is not the case in the West.

The inconsistency of metaphysical arguments in the West has led many thinkers to confine themselves to meeting the objections of modern materialism, which denies immortality, by claiming that consciousness is only a function of the brain and, therefore, ceases to be a brain process. In general, the brain is divided into 2; some Muslim scholars state that humans have a rational and material brain. However, the knowledge that has been widely studied and reviewed by modernists only focuses on the rational brain, so this intuitive brain is like a stepchild.

Contemporary Muslim psychologists have argued against secular Western psychology. Islamic psychology is a vital subject for Muslims interested in psychological research. The goal of nafsiology by Sukanto Mulyo is to incorporate Islamic principles into psychology and produce a new branch of psychology dubbed Islam. This separation sets apart the three concepts of transcendent nature, religion, and understanding of God.[113]

ENDNOTES

[1] Ahmat Miftakhul Huda, et.al, Intellect in the Study of the Qur'an and Neuroscience, *Indonesian Journal of Islamic Education, Volume 5, Number 1*, Yogyakarta, 2020, p. 68.

[2] Taufiq Pasiak, *God in the Human Brain, Realizing Spiritual Health Based on Neuroscience*, Bandung, Mizan, 2012. P. 32-35.

[3] Larry R. Squire, et.al, *Fundamental Neuroscience (Second Edition), Sandiego (California)*, Academic press, 2003, p. 3.

[4] Suyadi, Integration of Islamic Education and Neuroscience and Its Implications for Basic Education (PGMI), *Journal: Al-Bidayah, Vol. 4 No. 1,* 2012, p. 113.

[5] Rania Awaad Bilal Ali, Fahad Khan, Hooman Keshavarzi, *Applying Islamic Principles to Clinical Mental Health Care* (New York: Taylor and Francis, 2020).

[6] Abdallah Rothman, *Developing A Model Of Islamic Psychology And Psychotherapy Islamic Theology And Contemporary Understandings of Psychology* (New York: Routledge Taylor and Francis, 2022).p.37.

[7] Agus Mustofa, *Traces of the Life*, Surabaya, PADAMA Press, P.109.

[8] *Op.cit*, p. 7.

[9] Malik Badri, Abu Zayd Al-BAlkhi's, *Sustenance of The Soul (The Cognitive Behavior Theraphy of A Ninth Century Physycian), USA*, The International Institute Islamic Thought, Malta Gutenberg Press Ltd.

[10]Muhammad Uthman Najati, *The Soul in the View of Muslim Philosophers*, Bandung, Pustaka Hidayah, 2022, p. 331.

[11]Ibnu Muhammad Afrizal, "Jiwa Sebagai Bagian Dari Psikologi Dalam Perspektif Ibnu Sina", *Buletin KPIN (Konsorium Psikologi Ilmiah Nusantara)* 8. No, 23., no. islamic psychology (2022).

[12]Farid Younos, *Principles Of Islamic Psychology* (Bloomington: Author House, 2017).p.7.
[13]Gad Freudenthal, *Science In Medieval Jewish Cultures* (Mexico: Cambridge University Press, 2011).p.331.
[14] Muhammad Faiz Rofdli, Interpretation of Neuroscience Verses (A'ql in the Qur'an and Its Relevance to the Development of Critical Thinking in Islamic Education), Yogyakarta, *Journal At: Tibyan: Journal of Al-Qur'an and Tafsir Sciences, Volume 5, No.1,* p. 140.
[15]Mohd. Zaidi Ismail, *Aqal Dalam Islam: Satu Tinjauan Epistemologi* (Malaysia: Institut Kefahaman Islam, 2016).
[16]MUADDIB: Educational and Islamic Studies. Vol. 09 No. 02 July-December 2019, p. 157.
[17] Muhammad Faiz Rofdli, Interpretation of Neuroscience Verses (A'ql in the Qur'an and Its Relevance to the Development of Critical Thinking in Islamic Education), Yogyakarta, *Journal At: Tibyan: Journal of Al-Qur'an and Tafsir Sciences, Volume 5, No.1,* 2020.
[18]Citra Trisna Dewi, Nur Wulandari Fitri, and Ovi Soviya, "Neurosains Dalam Pembelajaran Agama Islam", *Ta'allum: Jurnal Pendidikan Islam* 6, no. 2 (2018): 259–80, https://doi.org/10.21274/taalum.2018.6.2.259-280.
[19]Ahmat Miftakhul Huda, et.al, Intellect in the Study of the Qur'an and Neuroscience, *Indonesian Journal of Islamic Education, Volume 5, Number 1,* Yogyakarta, 2020.
[20]Djamal, *Paradigma Penelitian Kualitatif* (Yogyakarta: Pustaka Pelajar, 2017).p. 9.
[21]Wahyudin, "Inkorporasi Pemikiran Nurcholis Madjid Tentang Pluralisme Agama Dalam Pendidikan Islam", (UIN Sunan Kalijaga, 2009).p.22.
[22]Ronny Kountur, *Metode Penelitian Untuk Penulisan Skripsi Dan Tesis* (jakarta: Buana Printing, 2009).
[23]Mary W. George, *The Elements of Library Research (What Every Student Needs to Know)* (United Kingdom, Oxford: Princenton University Press, 2008).
[24]Budiarta, *Metodologi Penelitian Kesehatan Dengan Contih Bidang Ilmu Kesehatan Gigi* (Jakarta: Penerbit Buku Kedokteran, 2006).
[25]Abuddin Nata, *Metodologi Studi Islam* (Jakarta: PT Raja Grafindo Persada, 2003).
[26]Ali Mansuri, *Teori Common Link G.H.A Juynboll Melacak Akar Kesejahteraan Hadits Nabi* (Yigyakarta: LKis, 2007).
[27]Nurul Hikmah, *Intellect of Reason and Heart in Islam,* Bait Qur'any At-Tafkir, p. 123.
[28]Muhammad Izuddin Taufiq, *Theorem of Anfus Al-Qur'an and Embryology (Verses About the Creation of Man),* Solo, Tiga Serangkai, 2006, p. 209.
[29]Harun Nasution, *Intellect and Revelation in Islam,* Jakarta, University of Indonesia, 1986, p.13.
[30]Muhammad Uthman Najati, *Soul in the View of Muslim Philosophers,* Op.cit. p. 31.
[31]Muhammad Ali Abu Rayyan, *Tarikh Al-Fikr Al-Falsafi Fi Al-Islam,* Al-Iskandariyah, Dar Al-Jami'at Al-Mishriyyah, 1984, 240.
[32]*The Soul in the View of Muslim Philosophers,* Op.cit., p. 43-44.
[33]Abu Bakr Muhammad Zakaria Ar-Razi, *Ath Thibb Ar-Ruhani,* in the book *Rasail Falsafiyyah,* Beirut, p. 27-30.
[34]Fikri Suadu, *Heart (Qalb) And Brain an Overview of Neurophilosophy (Classical Islam and Modern West),* Yogyakarta, PT Nas Media Indonesia IKAPI Member, 2018, P.9
[35]Al-Farabi, *Ara u Al-Madina Al-Fadhilah Wa Mudhadati Ha,* p.22-23.
[36]Malik Badri, Abu Zayd Al-Balkhi's, *Sustenance of The Soul (The Cognitive Behavior Theraphy of a Ninth Century Physician, USA,* The International Institute Islamic Thought, Malta Gutenberg Press Ltd, p.3.
[37]Musfichin, Body and Soul Balance Perspective Abu Zaid Al-Balkhi, Banjarmasin, *Journal of Human Studies. Vol. 7. No.1,* UIN Antasari Banjarmasin, 2019, p. 67.
[38]Ismail Raji Al-Faruqi, *TAWHID Its Implications for Though and Life*, The International Institute of Islamic Thought, 1982, p. 51-54.
[39]742 . المحوي الروي، الأدباء ادات الأريب لى الأديب ار الغرب الإسلامي، 1993،.

[40]Op.cit. *Balance Body and Soul Perspective Abu Zaid Al-Balkhi, Banjarmasin* p.5.
[41]Malik Badri, *Abu Zayd Al-Balkhi's Sustenance of The Soul (The Cognitive Behavior Therapy of a Ninth Century Phycisian),* London, The International Institute of Islamic Thought, 2013, p. 1-2.
[42]Elizabeth Diana Dewi, Muslim Psychologist Profile: Abu Zayd Al-Balkhi, *https://insists.id/profil-psikolog-muslim-abu-zaid-al-balkhi/* , Friday: 15.40.
[43]Op. cit. *Abu Zayd Al-Balkhi's Sustenance of The Soul (The Cognitive Behavior Therapy of a Ninth Century Phycisian),* p.11.
[44]Ibid, p.11.
[45]Seyyed Hossein Nasr, *Three Major Madzhabs of Islamic Philosophy,* trans. *Three Muslims Sages: Avicenna- Suhrawardi- Ibn 'Arabi,* Translator: Ach Maimun Syamsuddin, Yogyakarta, IRCSod, 2014, p. 41.
[46]Ahmad Ridlo, *Ibn Sina Scientist, Poet, World's Great Philosopher,* Indonesian Great Children Publisher, 2018, p.47.
[47]Op.cit, *Soul in the View of Muslim Philosophers,* p. 168-169.

[48]Op.cit. *Islamic Education and Neuroscience: Tracing the Traces of Intellect and Brain in the Qur'an to the Development of Neuroscience in Islamic Education,* p. 11.
[49]Taufiq Pasiak, " *Introduction, Between Empirical God and Spiritual Health* ". In Taufiq Pasiak (ed), *Empirical God and Spiritual Health, Musa Asy'arie's Thought Development in Health and Medicine,* Yogyakata, Center for Neuroscience Health and Spirituality (C-NET) UIN Sunan Kalijaga, 2012, p. 8-9.
[50]Fikri Suadu, *Heart (Qalb) and Brain (A review of Classical and Western Islamic Neurophilosophy),* Yogyakarta, PT Nas Media IKAPI Member, 2022, p. 19.
[51]Ibid, O.C. Gruner, *A Treatise on the Canon of Medicine of Avicenna*, 1970.p.94.
[52]Gruner.p. 94
[53]Gruner. p. 98
[54]Gruner. p. 93.
[55]Op.cit. *Heart (Qalb) and Brain (A review of Classical and Western Islamic Neurophilosophy),* p.20.
[56]Nurul Hikmah, *Intellect of Mind and Heart in Islam (The Concept of Thinking in Islam A Study of Intellect of Mind and Intelligence of Heart in Islam),* Bayt Qur'any. P.122.
[57]Harun Nasution, *Intellect and Revelation in Islam,* Jakarta, University of Indonesia, 1986, p. 9.
[58]Donald C Cooper, *Introduction to Neuroscience I.* (nd). (np), Google Books, p.2.
[59]Ernesto Schiefelbein et. al, *Learning to Educate Proposals for the Reconstruction of Education in Developing Countries,* Sense Publisher, 2017, p.28.
[60]RichardA.P Roche, and Se'an Commins, *Pioneering Studies in Cognitive Neuroscience,* New York, McGraw Hill Open University Press, 2009, p. 4.
[61]*Thoughts.* (nd). (np): PediaPress.Google Book□p.277.
[62]Op.cit. *Introduction to Neuroscience,* p. 3
P.2.
[63]Uthman Najati, *The Soul in the View of Muslim Philosophers,* Bandung, Pustaka Hidayah, 2002, p.330.
[64]48 . الحميد الح ان، اب الفراسة لفخر الدين الرازي، اكس، الم الكتب، 2002م.
[65]72 . السابق.

[66]Op.cit. *Aqal in Islam One Epistemological Review,* p. 66.
[67]Ibid, p. 69.
[68]Op.cit. *Aql And Brain in The Study of Neurosins and Its Implications of Scientific Approach in Islamic Education,* P. 172.
[69]Norhasanah, The Influence of the Concept of Intellect in the Development of Islamic Education, *Journal of Reason. Vol.1, No. 2,* December, 2017. p. 143.
[70]Miska Muhammad Amien, Islamic Epistemology Introduction to the Philosophy of Islamic Knowledge, Jakarta, UI Press, 2006, p. 29.
[71]Op.cit. *Brain and Reason in Neuroscience Verses,* p.35
[72]Op.cit , Aqal in Islam An Epistemological Review, p. 69.

[73]Muhammad Daming, *Al-Qur'an Perspective Mind, Zawiyah Journal of Islamic Thought,* Vol. 2, No. 1, 2016, p.19.
[74]Op.cit. *Brain and Reason in Neuroscience Verses,* p. 37
[75]Op.cit. *Islamic Epistemology Introduction to the Philosophy of Islamic Knowledge,* p. 9.
[76]Pasiak, *Revolution IQ/EQ/SQ, Between Neuroscience and the Qur'an,* PT Mizan Pustaka, 2004, p. 190.
[77]Op.cit, *Intellect and Revelation in Islam,* p. 12.
[78]Hamka Haq, *Al-Syathibi (Theological Aspects of the Maslahah Concept in Kitab Al-Muwafaqat),* P.42.
[79] Ubaidillah Achmad, Islam Geger Kendeng in Ecological Conflict and Grassroots Reconciliation, Jakarta, Prenadamedia, 2016, P. 320.
[80]Op.cit. *Traces of the Life,* p. 108.
[81]Op. cit. *Traces of the Life,* p. 118.
[82]Mohd Zaidi Bin Ismah, *Aqal in Islam an Epistemological Review,* Malaysia, IKIM Publishers, 2018, p. 63.
[83]P.32.
[84]Fu'ad Arif Noor, Brain and Intellect in Neuroscience Verses, *Journal: Manarul Qur'an. Volume.18. No.1,* Yogyakarta, College of Islamic Education (STPI), 2018P.117.
[85]Moheb Costandi, *The Human Brain: 50 Ideas You Really Need to Know,* London, Quercus, 2013, p. 3.
[86]History of IBRO, *International Brain Research Organization,* 2010.
[87]The Beginning, *International Society for Neurochemistry.* 2009.
[88]About SFN, *Society for Neuroscience.*

[89]Op.cit. p.2-5. Suyadi suggests seeing also, Fischer, Kurt W, " *Mind, Brain and Education: Building a Scientific Groundwork for Learning and Teaching*". International Journal Compilation Mind, Brain, and Education Society and Wiley Periodicals, Inc. Volume 3- Number 1, p.2, Then see also Jeevas Malcolm, "Brain, *Mind and Behavior.* In Brown Warren, Murphy Nancey, Malony Newton (eds), *Whatever Happened to The Soul (Mini-apolis-Augsburg Fortress,* 1998), p. 72. See also Drafting Team, *2013 Curriculum, Basic Competencies,* Jakarta, Ministry of Education and Culture.
[90]Taufik Pasiak, *God in the Human Brain,* 2010, p. 132.
[91]VandenBos, GR (ed.). (2007). *APA Dictionary of Psychology.* Washington DC: American Psychological Association, p. 5.
[92]Op.cit. *Brain and Intellect in the Study of the Qur'an and Neuroscience,* p.71.
[93]Op.cit, *Relevance of Neuroscience Concepts,* p. 145.
[94]Pasiak, T. (2012). *God in the Human Brain: Realizing Spiritual Health Based on Neuroscience.* Bandung: Mizan. Harun, J. (2013). P. 5.
[95]Aminul Wathon, Neuroscience in Education, *LENTERA Journal: Religious Studies, Science and Technology,* Vol.13. No.2, 2015, p. 137.
[96]P. 15.
[97]Ifa H. Misbach, *Dahsyatnya Sidik Jari Menguak Bakat & Potensi Melalui Finger Print Analysis* (Visimedia, 2010).p.14
[98]Ifa H. Misbach.
[99]Ronny Lesmana, et.al. *Basic Physiology for Pharmacy, Nursing and Midwifery Students,* Sleman, DEEPUBLISH Publishers, 2017, P.146-151.
[100]Richard Claproth, *The Enormous Danger of Midbrain Activation (Revealing the Controversy of Midbrain Activation and Investigative Mass Hypnosis),* Crasindo, Goggle Book, P.70.
[101]Op.cit. *Minds Behind the Brain (A History of the Pioneers and Their Discoveries),* P. 61.
[102]Ibid, p. 62-65.
[103]Op.cit. *Minds Behind the Brain (A History of the Pioneers and Their Discoveries),* p.70.
[104]*Ibid.* p. 75-76.
[105]Ibid. p. 77-78.
[106]Gordon M. Spherd, *Foundation of The Neuron Doctrines,* Oxford, Oxford University Press, p. xxx.
[107]Op.cit. *Traces of the Life,* p. 109.
[108]Op.cit. *Foundation of The Neuron Doctrines,* p. 78.
[109]Larry W Swanson. Et.al, *The Beautiful Brain the Drawings of Santiago Ramon Y Cajal,* ABRAMS, 2017, p. 34.
[110]Ibid. p. 110-112.
[111]Ibid, p. 114.
[112]Yus Rusdian, *Muhammad Iqbal (Rebuilding Religious Thought in Islam),* Google Book, 2020, P. 104.
[113]Agus Handoko, "Eksistensi Antara Psikologi Islam Dan Barat Modern", *Jurnal Sosial Dan Budaya Syar-I* 8, no. 4 (2021): 1–20, https://doi.org/10.15408/sjsbs.v8i4.22137.

REFERENCES

.المحوي الرومي، الأدباء ادات الأريب لى الأديب ار الغرب الإسلامي، 1993

.الحميد الح ان، اب الفراسة لفخر الدين الرازي، اكس، الم الكتب، 2002م

About SFN, *Society for Neuroscience.*

Al-FaruqI, Ismail Raji *TAWHID Its Implications for Though and Life,* The International Institute of Islamic Thought, 1982.

Al-Farabi, *Ara u Al-Madina Al-Fadhilah Wa Mudhadati Ha,*

Ar-Razi, Abu Bakr Muhammad Zakaria *Ath Thibb Ar-Ruhani,* in the book *Rasail Falsafiyyah,* Beirut,

Badri, Malik Abu Zayd Al-Balkhi's, *Sustenance Of The Soul (The Cognitive Behavior Theraphy Of A Ninth Century Physycian), USA,* The International Institute Islamic Thought, Malta Gutenberg Press Ltd.

Costandi, Moheb *The Human Brain: 50 Ideas You Really Need To Know,* London, Quercus, 2013

Dewi, Elizabeth Diana Muslim Psychologist Profile: Abu Zayd Al-Balkhi, *https://insists.id/profil-psikolog-muslim-abu-zaid-al-balkhi/* , Friday: 15.40.

Fitriani, Hermala and Zuhair Abdullah, The relevance of Taufiq Pasiak's Spiritual Neuroscience Concept to Sufistic Psychotherapy, *Journal of Sufism and Psychotherapy, Volume 1. Number 2, Tasawuf and Psychoteraphy Program,* Faculty of Ushuluddin, Adab and Da'wah, IAIN Pekalongan, 2021.

Haq, Hamka Al-Syathibi (Theological Aspects of the Maslahah Concept in Kitab Al-Muwafaqat,

Wisdom, Nurul *Intelligence of Reason and Heart in Islam (The Concept of Thinking in Islam A Study of Intellect of Mind and Intelligence of Heart in Islam),* Bayt Qur'any.

History of IBRO, *International Brain Research Organization,* 2010. Huda, Ahmat Miftakhul et.al, Intellect in the Study of the Qur'an and Neuroscience, *Indonesian Journal of Islamic Education, Volume 5, Number 1,* Yogyak arta, 2020.

Iqbal. Muhammad, Yus Rusdian *(Rebuilding Religious Thought in Islam),* Google Book, 2020.

Ismah, Mohd Zaidi Bin *Aqal in Islam an Epistemological Review,* Malaysia, IKIM Publishers, 2018,

Lesmana. Ronny et al. Basic Physiology for Pharmacy, Nursing and Midwifery Students, Sleman, DEEPUBLISH Publishers, 2017,

MUADDIB: Educational and Islamic Studies. Vol. 09 No. 02 July-December 2019,

Muhammad Uthman Najati, *Soul in the View of Muslim Philosophers,* Bandung, Hidayah Library, 2022.

Musfichin, Body and Soul Balance Perspective Abu Zaid Al-Balkhi, Banjarmasin, *Journal of Human Studies. Vol. 7. No.1,* UIN Antasari Banjarmasin, 2019,

Uthman *Jiwa in the View of Muslim Philosophers,* Bandung, Pustaka Hidayah, 2002,

Nasution, Harun *Intellect and Revelation in Islam,* Jakarta, University of Indonesia, 1986,

Noor, Fu'ad Arif Brain and Intellect in Neuroscience Verses, *Journal: Manarul Qur'an. Volume.18. No.1,* Yogyakarta, College of Islamic Education (STPI), 2018

Nurul Hikmah, *Intellect of Reason and Heart in Islam,* Bait Qur'any At-Tafkir,

Pasiak, T. (2012). *God in the Human Brain: Realizing Spiritual Health Based on Neuroscience.* Bandung: Mizan. Harun, J. (2013).

Puji Prihwanto, et.al, *Cross-Religious and Cultural Counseling Strategies for Counseling in the Modern Era,* Guepedia, 2021

Rayyan, Muhammad Ali Abu *Tarikh Al-Fikr Al-Falsafi Fi Al-Islam,* Al-Iskandariyah, Dar Al-Jami'at Al-Mishriyyah, 1984,

Rofdli, Muhammad Faiz Tafsir Verses of Neuroscience (A'ql in the Qur'an and Its Relevance to the Development of Critical Thinking in Islamic Education), Yogyakarta, *Journal At: Tibyan: Journal of Al-Qur'an and Tafsir Sciences, Volume 5, No.1,* 2020.

Ruri Afria Nursa and Suyadi, Al-Farabi's Concept of Multilevel Intellect in Neuroscience Theory and Its Relevance to Islamic Education, *Tawazun Journal: Journal of Islamic Education,* Bogor, UIKA, 2020.

Squire, Larry R. et.al, *Fundamental Neuroscience (Second Edition), Sandiego (California),* Academic press, 2003,

Suadu, Fikri *Hati (Qalb) and Brain A Neurophilosophy Review (Classical Islam and Modern West),* Yogyakarta, PT Nas Media Indonesia IKAPI Member, 2018,

Suyadi suggests seeing also, Fischer, Kurt W, " *Mind, Brain and Education: Building a Scientific Groundwork for Learning and Teaching*". International Journal Compilation Mind, Brain, and Education Society and Wiley Periodicals, Inc. Volume 3- Number 1, p.2, Then see also Jeevas Malcolm, "*Brain, Mind and Behavior.* In Brown Warren, Murphy Nancey, Malony Newton (eds), *Whatever Happened to The Soul (Mini-apolis-Augsburg Fortress,* 1998), p. 72. See also Drafting Team, *2013 Curriculum, Basic Competencies,* Jakarta, Ministry of Education and Culture.

Suyadi, Integration of Islamic Education and Neuroscience and Its Implications for Basic Education (PGMI), *Journal: Al-Bidayah, Vol. 4 No. 1,* 2012,

Suyadi, *Islamic Education and Neuroscience: Tracing the Traces of Reason and Brain in the Qur'an to the Development of Neuroscience in Islamic Education,* Jakarta, Prenadamedia Group,

Taufik Pasiak, *God in the Human Brain,* 2010,

Taufiq Pasiak, " *Introduction, Between Empirical God and Spiritual Health* ". In Taufiq Pasiak (ed), *Empirical God and Spiritual Health, Musa Asy'arie's Thought Development in Health, and Medicine,* Yogyakata, Center for Neuroscience Health and Spirituality (C-NET) UIN Sunan Kalijaga, 2012.

Pasiak, *God in the Human Brain, Realizing Spiritual Health Based on Neuroscience,* Bandung, Mizan, 2012.

Taufiq, Muhammad Izuddin *Dalil Anfus Al-Qur'an and Embryology (Verses About the Creation of Man),* Solo, Tiga Serangkai, 2006.

inning, *International Society for Neurochemistry.* 2009.

ah Achmad, Islam Geger Kendeng in Ecological Conflict and Grassroots Reconciliation, Jakarta, Prenadamedia, 2016, P. 320.

VandenBoss. GR (ed.). (2007). *APA Dictionary of Psychology.* Washington DC: American Psychological Association,

Watton. Aminul Neurosains in Education, *LENTERA Journal: Religious Studies, Science and Technology,* Vol.13. No.2, 2015.